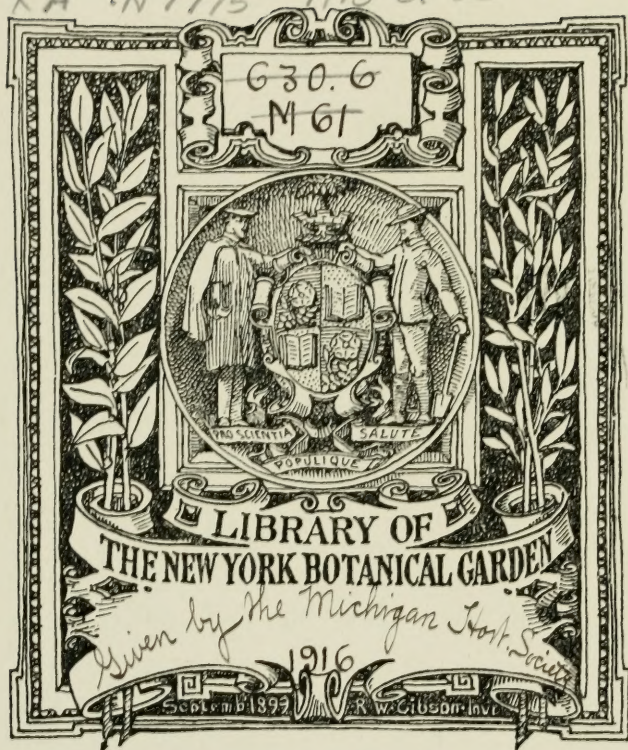


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FORTY-THIRD ANNUAL REPORT

OF THE

SECRETARY

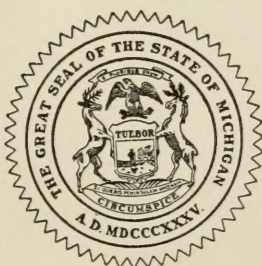
OF THE

STATE HORTICULTURAL SOCIETY

OF

MICHIGAN

FOR THE YEAR 1913



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REPORT OF THE SECRETARY OF THE MICHIGAN STATE
HORTICULTURAL SOCIETY.

FENNVILLE, MICHIGAN,

January 1, 1914.

TO HON. WOODBRIDGE N. FERRIS, *Governor of the State of Michigan:*

In compliance with legal requirements, I have the honor to submit herewith the accompanying report of 1913, with supplementary papers.

I believe that a careful review of the papers and discussions that follow will be of great value in helping the development of the horticultural possibilities of our great State.

Respectfully yours,

CHARLES E. BASSETT,

Secretary Michigan State Horticultural Society.

NOV 18 1916

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VICE-PRESIDENT—CHARLES A. PRATT, Benton Harbor.

SECRETARY-TREASURER—ROBERT A. SMYTHE, Benton Harbor.

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E. O. LADD, Old Mission, 2 years.

CHARLES F. HALE, Grand Rapids, 1 year.

H. J. EUSTACE, Agricultural College, 1 year.

FRANK A. WILKEN, South Haven, 3 years.

A. B. MERRITT, Manistee, 3 years.

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NEW FRUITS—FRANK A. WILKEN, South Haven;

CHAS. F. HALE, Grand Rapids.

FINANCE—CHAS A. PRATT, Benton Harbor.

A. B. MERRITT, Manistee.

ENTOMOLOGY—R. H. PETTIT, East Lansing.

VEGETABLE PHYSIOLOGY—G. C. COONS, East Lansing.

FORESTRY—CHAS. W. GARFIELD, Grand Rapids.

LEGISLATION—R. A. SMYTHE, Benton Harbor.

C. E. BASSETT, Fennville.

LANDSCAPE GARDENING—THOS. GUNSON, East Lansing.

REPORT OF THE FORTY-THIRD ANNUAL MEETING OF THE MICHIGAN STATE HORTICULTURAL SOCIETY, HELD AT TRAVERSE CITY, DECEMBER 2-4, 1913.

The forty-third annual meeting of the Michigan State Horticultural Society, which was held at Traverse City, December 2, 3, 4, was a decided success from every standpoint.

The value of the program was apparent from the very beginning, for one of the first talks given was one of the most valuable given before the society in years. The place of meeting was in itself interesting and was a good illustration of the newer religion, the practical and applied Christianity. The building was that of the Central Methodist Church, in which were rest rooms, a gymnasium, shower baths and other things of interest to its younger members. The attendance at all sessions was very good but would have been better if it had not been so difficult for those in the southern part of the state to get there. The interest manifested however, was of the very best and there were spirited discussions on all subjects.

No one subject predominated in interest, which is unusual at such meetings. Among the most prominent given attention were the subjects of spraying, thoroughness in spraying, pruning, marketing and advertising. The good interest shown all subjects is probably due to the fact that each speaker had his subject well in hand and had a message of value to present.

THIRTY YEARS OF FRUIT GROWING ON THE PENINSULA.

E. O. LADD, OLD MISSION.

The history of fruit growing on the Peninsula dates back much farther than thirty years. Indeed, it was shown conclusively forty years ago at a joint meeting of this society with the Grand Traverse Union Agricultural Society at the annual fair, that this region was destined to become a great fruit producing section. The first fruit trees on the Peninsula were apple trees grown from seeds planted by the Indians. I remember very well when a small boy before we had any other fruit, how good those apples tasted. The early white settlers of this region planted fruit trees mainly to furnish fruit for home use and as an experiment to see what fruits, if any, could be successfully grown so far north. The "Fruit Belt" of Michigan was then supposed to be a

narrow strip of land along the shore of Lake Michigan, the northern limit of which was very indefinite.

The Peninsula, as you all know, is a narrow strip of land extending from the head of Grand Traverse Bay some twenty miles in a north-easterly direction, dividing the bay into two arms, known as the east and west arms. The waters of Grand Traverse Bay are said to be very deep, in many places as deep as anywhere in Lake Michigan, thus exercising a peculiarly favorable influence upon the climate; the soil is varied in character but the greater portion of it may be described as a dark sandy loam, naturally well drained and easy to work, a soil easily exhausted by improper methods of handling, but under a wise system of management is capable of maintaining its fertility and resisting the effects of drouth to a remarkable degree.

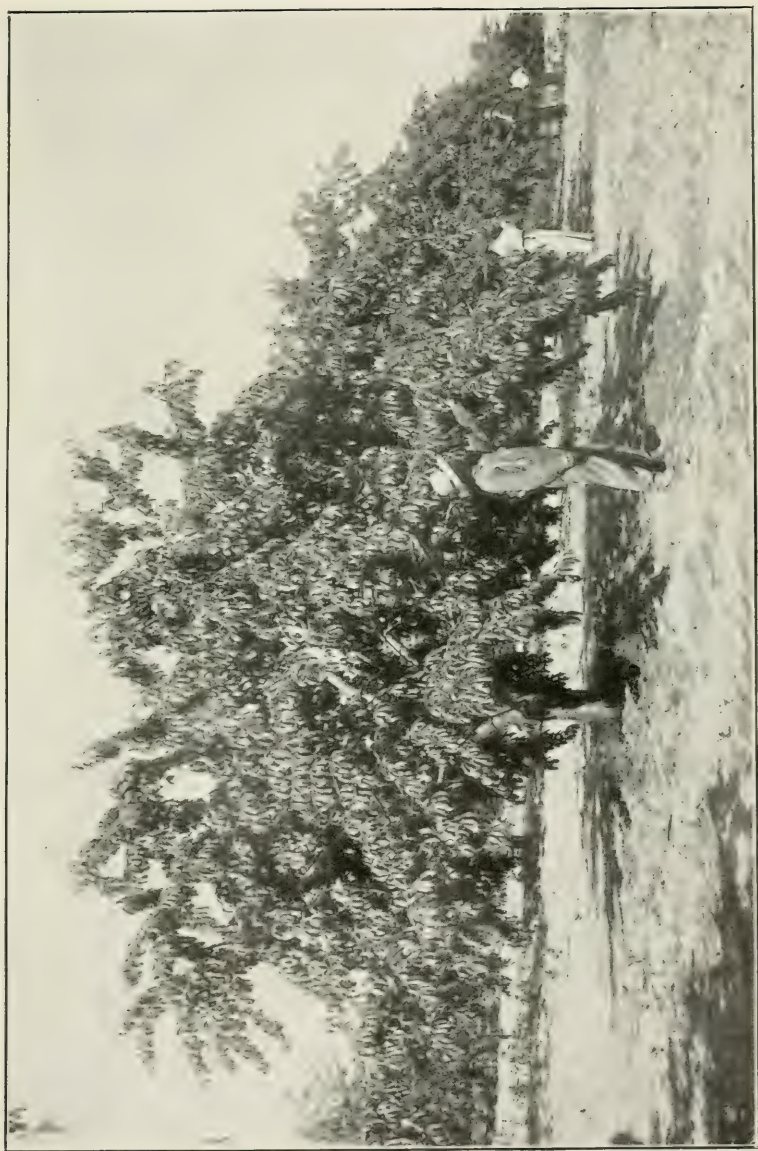
The surface is mostly a succession of undulating plains, hills and valleys, the highest points being about three hundred feet above the bay level, thus furnishing the necessary atmospheric drainage and providing excellent locations on nearly every section of land for the production of fruit. The records kept at the Old Mission weather station for the past 19 years show an average annual rainfall of over thirty inches, well distributed throughout the growing season. These records show for the present year from January 1st to December 1st, eleven months, a rainfall of 31 85/100 inches, of which 14 2/100 inches fell during the five months of May, June, July, August and September.

The first attempt at fruit growing on a commercial scale was in the fall of 1860 when apple trees were procured from a New York nursery for the planting of three orchards of about 400 trees each, consisting largely of Greenings, Baldwins and Northern Spies. Two of these orchards were planted on good soil and favorable locations and are still alive and producing fruit. The other was dead and gone long ago, due, I think, to three causes, (1) poor location, being down on low flat land but little above the bay level, (2) poor soil, (3) neglect.

The Peninsula has an area of seventeen thousand acres. A careful estimate made by the Board of Supervisors three years ago placed the number of acres then set out to fruit at seventeen hundred or one-tenth the total area, and 42% of the total orchard acreage of the entire county. Large plantings have been made during the last three years, so that there is at the present time probably two thousand acres set out to fruit trees.

In 1867 Mr. George Parmelee bought a large tract of land on the north end of the Peninsula and after two or three years of preparation set out his large apple orchard of one hundred acres and twenty acres to other fruits. Closely following Mr. Parmelee came C. P. Avery, Tracy & Reynolds, A. P. Gray, Benjamin and Amos Montague, W. D. Bagley, H. W. Curtis and others, each of whom planted large apple orchards as did also several of the older residents of the town. This was before the days of cold storage for apples, and the plantings were largely of Golden Russets on account of their long keeping qualities. Most of them have since been top grafted to other more desirable sorts and have proved to be very good stock for such purpose.

In a general way it may be said that it was about thirty years ago that apples began to be produced for commercial purposes. I well remember about this time that our young apple orchard of 300 trees which I helped to plant when a small boy produced what was up to that



Windsor Cherry Orchard of M. J. Gilmore on Grand Traverse peninsula.

time its largest crop of fruit when we packed up 520 barrels. Most of the fruit at this time was shipped to Chicago to Stewart & Wolcott, commission merchants. Mr. Stewart came up every fall for several years and went around among the farmers showing them how to sort and pack the apples.

Individual reputations were built up in those early days for honest packing, as is shown by an instance told me by a friend who saw the transaction.

I have spoken mostly of apples but pears, plums, peaches and cherries were also grown to a limited extent. The most serious pest we had to contend with was the codling moth, with no remedy except to bandage the trees and destroy the worms that could be caught hiding under the bands. The plum curculio had to be fought by jarring the trees and killing those that would fall on to a sheet or canvas placed under the trees. The curculio would also often work on cherries and both plum and cherry trees would sometimes lose their foliage because of the blight and seriously injure the vitality of the trees. We first commenced spraying about 25 years ago, using only water and paris green to destroy the young worms of the codling moth but nothing was done toward spraying for fungous diseases until several years later. People were slow to believe in the benefits of spraying as many who did spray failed to do thorough work or to spray at the right time.

In September, 1895, the State Horticultural Society held a meeting here in connection with the county fair. At that time Mr. Smith Hawley of Ludington gave an address at the fair grounds on "The Revival of Apple Culture in Michigan." In this address he gave his experiences in two years' use of the Bordeaux mixture. He told at just what stage of growth the different sprayings were given and emphasized the importance of thoroughness in the work. Here was the experience of a practical man who had obtained wonderful results from spraying. That address was worth a great deal to those who heard it and from that time on more thorough work was done in the way of spraying on the Peninsula. We soon learned to control the curculio as well as the codling moth and fungous diseases of the plum and the cherry as well as of the apple. But it was not until 4 or 5 years ago that power sprayers began to be used.

The cherry has lately come into prominence as a profitable fruit to grow in this region. It can be grown to great perfection here and will yield a greater net profit per acre than any other fruit we can grow. The fear of not being able to get help enough to pick them has prevented many from setting out large orchards, but we are beginning to see now that those who have the most cherries to pick have the least trouble to get pickers.

It is sometimes argued that the fruit grower should grow fruit exclusively and not combine it with any other branch of farming. The man with only a small area in a favored location may well devote it all to the production of fruit, depending on outside sources for maintaining the fertility of the soil and supplying the needs of the home. But the great majority of people who grow fruit do and I think always will combine it with some other branch of farming. The general farmer usually depends on one or two leading money crops to which he gives special attention, arranging other crops in the rotation with reference to maintaining the fertility of the soil and supplying the needs of the

home. The fruit grower may well adopt this plan and make fruit the leading money crop. On nearly every farm there are some locations better adapted to fruit growing than others. These may well be set out to fruit to the extent of from one-fourth to one-half of the cultivated area.

Many of our farmers on the Peninsula have found that dairying fits in well with the fruit business as is evidenced by the large number of silos that have been put up in recent years. Our land is too valuable for grazing purposes but we can with the aid of the silo and by the use of the two great forage crops—corn and clover—compare favorably with any section of our county in the production of dairy products. Fruit growing and dairying may well go together, the one furnishing a direct money crop to be sold off the farm, the other furnishing a good market right at home on the farm for all the forage crops that can be grown and while realizing a profit from feeding them out, still retaining to the farm a large per cent of their fertilizing value. This system along with the use of cover crops in the orchards supplemented by small quantities of mineral fertilizers will greatly aid in the production of more and better fruit. There are also other advantages in this combination, it helps to distribute the labor of the farm more evenly throughout the season, giving something for men and teams to do when not needed in the orchard. It helps to supply the needs of the home by furnishing the things which we have come to regard as essential to the art of good living.

DISCUSSION.

Q. Give the list of varieties and proportions for a model orchard in the Grand Traverse section, of apple, peach, cherry and small fruit?

Mr. E. O. Ladd: I can give you my opinion. Fall apples—Duchess and Wealthy. Winter apples—Greenings, Baldwins, Northern Spy, Wagners, Hubbardston and Canada Red.

A member: I think there should not be too many varieties, and that one fault with the older orchards is there are too many varieties. For commercial purposes we should confine ourselves to a few leading varieties.

Q. Will severe pruning of young trees hasten or retard bearing?

Mr. Wilken: The severe pruning of young trees generally tends to check early bearing, because severe pruning in spring will tend to make the tree make good growth; I just prune lightly, shaping up the head.

Q. What is the average cost of producing and packing a barrel of apples? The cost of a bushel of peaches and a crate of strawberries?

Mr. Wilken: That was answered by Mr. Case—\$1.00 to \$1.25.

A. What causes the Baldwin and Jonathan Spot? How prevented?

Mr. Wilken: The Baldwin and Jonathan spots are both parasitical trouble, and is a breaking down of the cells of the fruit. The Spy has about the same, and there is no cure for it. The Jonathan spot is very often found on the tree, but more often found after it has been in cold storage two or three weeks. The spots don't grow much in the winter, but sink more on account of the drying of the fruit.

Q. How does the dry powdered arsenate of lead compare with the paste, in cost and in value as an insecticide?

A Member: It was used by a neighbor of mine with good results. It doesn't cost any more; he claimed it was easier to use.

Mr. Wilken: We used dry lead to some extent last year at the station, and we found it used up much better than the paste; it costs a little more than the paste. As far as effectiveness is concerned, they were about equal. It will not freeze.

Mr. Farnsworth: We had a little experience in the apple orchard. It mixed much more readily and was more handy.

Mr. Eustace: It will work all right, but there is a great deal of sentiment working up against it because it is very poisonous. If you get too much in your hands it might kill you. Some have been made seriously sick and some have died from the use of it, and the sentiment is working against the manufacturers making it. They are about equal in results.

Q. To what extent shall we set McIntosh Red, Delicious, Stayman, Lowland Raspberry, the J. H. Hale peach and other advertised brands?

A Member: (Mr. Cook) The McIntosh Red apple is very desirous to grow. The trees are good growers and the apples take very well on the market. Our trees have been set about ten years and in bearing about five years, and the trade takes them like the Snows. With the right kind of storage and market it appears to me to be a very desirous apple. I have five or six trees of the Delicious that I have been waiting to come into bearing. As grafts they are magnificent growers.

Mr. Bassett: The only trouble with the Staymen is the claim that the season is too short. In Delaware and New Jersey it is one of the most beautiful of apples.

Q. Is large size desirable to strive for in Michigan apples? Will it pay to raise the ordinary size Michigan Jonathans?

Mr. Cook: I would like to say a word for the Jonathan. It needs high feeding, but give it proper feeding and it is a very good variety; something that Michigan can grow to a high degree of perfection. It is more nearly a yearly bearer than any of the varieties that grow.

A Member: How about the spot that comes on them. I can grow them, but after they have matured about a month they spot.

Mr. Cook: I have always found it was well to get the Jonathan on the market early in December and January, as they often go down very rapidly.

Q. Should we plow a heavy orchard sod in fall or spring?

Mr. Ladd: I don't know any objections to plowing late in the fall; don't find any difference. If I have a heavy sod on the orchard and want to plow it up, I see no harm in it.

Mr. Bassett: Some of the best results in our district. Some of our neighbors started to fall plow their orchard, but didn't finish until the next spring. The part that was fall plowed showed an absolute gain over the other in fruit. In this particular case they demonstrated that fall plowing produced a good deal better crop than the spring plowing.

A Member: Were these apples in sod when they plowed?

Mr. Bassett. That orchard was in fine condition, and had very good feeding; it had the very best of care. They used cover crops. It is not an old sod; it is a well cared for orchard.

APPLE GROWING IN NEW YORK STATE.

B. J. CASE, SODUS, N. Y.

My wife said I should tell you the first thing that she was born in Michigan. I want to say that I am very glad to be here. I have no set speech—I came here to learn. I have been studying fruit growing all my life; my father was a fruit grower before me, and I have come to the conclusion that we do not half know our business yet. There are a whole lot of things that we take for granted that my father was convinced was the wrong thing to do, and a lot of things that we used to do in growing fruit we have abandoned. The experiment stations in New York State, in Ithaca and Erie, with their quota of very efficient workers, has been a very great advantage, but a bunch of us growers there in New York State that have no use for any scientific information or plans or schemes unless we can work them out practically on our farms believe that these experiments, etc., have to be practiced or they are no good to us. It is one of my old sayings that I have no use for an experiment that we have to count, weigh or measure to determine whether it is any good or not. If it is so close that we have to count, weigh or measure we have no use for it. We want to see it at once. Now, Mr. Bassett has rather embarrassed me before you in his note in your catalog that I am one of the best fruit growers in America. I don't claim any such thing. I am situated on the shore of Lake Ontario, 30 miles east of Rochester on the Ontario division of the New York Central. I will have to speak largely of my own farm in order to bring out my points—you will have to bear with me.

I have twenty-five acres of apples. Six acres of it were set by my father in the spring of 1853, making it sixty years of age. It was set two rods one way and three rods the other, setting peaches between; I can remember the peaches. I think there are 156 trees in that orchard, and that there are 140 or 143 of the original trees there now. I have another orchard of six acres that part of it father set in the fall of 1852. There are two or three, or perhaps four, trees there that my father claims were quite trees when my grandfather moved on the farm in 1828. Right across the road from me is an orchard that my uncle set in the spring of 1835, still in good bearing condition; I don't think there is any idea of tearing it out. I have four acres of orchard that was set about 1870. This we set rather irregular in places several years ago—I think they will not average quite 33 feet each way. I have had to go there and cut them out recently. I have another orchard that was set in 1881, 33 feet apart each way. Then I have an orchard of six acres that was set in the spring of 1882, 40 feet apart each way. That comprises the 25 acres.

I don't know how I am going to take up pruning. Now, these old apple trees—you can imagine the size of them. There were a lot of apples we could not get with a 30-foot ladder; we could not reach them with any spray, and there didn't seem anything to do but these tops must be lowered. So we conceived the idea—now the experiment station went back on us but we are getting the fruit just the same—of

cutting out the long limbs instead of the short ones. Now what we claim is that we have been trimming these trees wrong. As the limbs run out we have been cutting out these shorter limbs until we have a circle in the middle of these trees that don't bear anything. Our point was to bring them back. We commenced where the limbs run out and we cut off long limbs, and go over the tops the same way. In this way we have lowered these trees six or eight feet, and think we can pick all of them with a 24 or 26 foot ladder.

Now in planting our later plantings of apples we are setting them closer together. All the planting we have done in the last five years we are setting 20x24, keeping every variety in a block; I mean by this not mixing varieties. I want you to take that in—20x24. Our idea is this. You take the three large growing varieties—the Baldwins, Greenings and Spys. We have them perhaps three feet, or as low as they would naturally head in a nursery. We claim that when a man gets on a job with both feet that he ought to make these trees show a paying crop in seven years. Trees set 20x24 will not crowd for about fifteen years, and you have eight years of good crops of apples off that orchard. I had your worthy president draw a diagram here showing the orchard—20x24. We are making it wider one way on account that, as the trees come together we want one way to drive through with a spraying machine, and to haul packages in and fruit out one way. We always make the 24 feet the way you would naturally come to a drive way. Now at the end of fifteen years they commence to crowd. We go through them diagonally and take out every other row. Now they are 31 feet each way, and they will not crowd for another ten years, until they are about 25 years old. I am speaking now of the large growing varieties—the Baldwins, Spys and Greenings. Of course you understand other varieties, such as the Wealthy, Mackintosh or the Duchess, would not crowd 20x24 in a long time, if ever. Now, they commence to crowd at 31 feet in 25 years. Then we go and cut out the odd trees, and you have them 40x28 feet, the ideal distance for Baldwins, Spys and Greenings, and you have been bearing apples all the while.

Now, I want to give you a few figures. Setting an orchard 20x24 you put 90 trees to the acre, and by the time that orchard is ten years old, if you have given it proper care, it ought to show five bushels to the tree; you have 450 bushels per acre. Now you go through and cut these out diagonally and you have reduced these trees to 45 to the acre, and you have to average ten bushels to the tree to get your 450 per acre. Now you go through and cut these out and you have reduced it to 22½ trees per acre; now you have to have 20 bushels per tree to equal the number of bushels you had at five bushels per tree, and you have been growing apples all the while. That is the point that we make. We don't mix varieties; I suppose you have been all over that ground. In the first place we don't take a bit of stock in crossing varieties. There may be orchards in the West where they had thousands of Ben Davis trees where they need it, but we don't think we need it in New York State. Now the critical things in my opinion is to spray before the bloom, known as the pink bud spray, and once after the bloom. One is for the fungus and the other for the codling moth. We usually have about ten days between; this last year I think we had only three or four days—usually it is about ten days. Now if your varieties are mixed you will find that when the Greenings are opened the apples have started

before the buds really open; that the Russets and the Spys, especially the Spys, are closed right up tight and when the Greenings are ready the Spys are not. If you wait until the Spys are ready the Greenings are in bloom. Another objection I find is the low-headed trees. The first man in Western New York who ever set low-headed trees was Willis Mann. He went to California several years ago and got that idea and came back and set out some low-headed trees 20x22, mixing his varieties, and he is having trouble over this point. His orchard is now getting to the point where he has to go through diagonally, so that he will soon have to get them out. Now these trees load right down with fruit, and he has to go around through the trees to pick these apples, and he cannot go through without knocking off the Baldwins. While if they were all Baldwins, Greenings or Spys he goes in and carries his package a couple of rows, picks his fruit and takes it out.

Then there is another point—a strong point. These different varieties very often need different cultivation. You cannot handle a Spy tree as you can handle a Greening or Baldwin or another variety. I am fully convinced that if we are going to be successful fruit growers we must keep absolute control over the growth of our trees. They must have a natural growth to be successful and a Spy will sometimes grow right away from the Greening and you cannot hold it down, while if you had it in a block by itself you could hold it down.

Now we come up to the question of making these trees bear. I will tell you my experience. I know it is said that I make Baldwins bear both years, but I am like every other fruit grower—I fall down in getting my work done as I would like it many times. Now the way these things come about, we have been trying all these years to get the Baldwin to bearing the odd year. It is full of apples one year and not even a bloom the next year, and we tried everything. We tried cutting the limbs and many other ways, but didn't succeed. I even sent an apple to a chemist and had a chemist examine the flesh of the apple, to know what we have to put on the soil to grow them. The chemist tells us that apple is nearly all water—95 or 96 per cent water, just a trace of potash in the flesh, but the seeds are high in potash and phosphoric acid. It does not exhaust our soil or strain our trees to pump water out of the soil to make the flesh of that apple, but what does exhaust our soil and strain our trees is to pump potash and phosphoric acid to make the seeds that grow that apple. Therefore, the larger apples you grow the less seeds you grow, the less you exhaust your soil and the less you strain your tree. There was a Baldwin tree right beside my garden that had a limb six inches in diameter, but I had to cut it off. There was a bushel of apples on it, and in order to try out thinning these apples I thinned it myself early in July, the rest of the tree not being thinned until the last of August or 1st of September. Greatly to our surprise, the next year that limb had a crop of apples on it again, and the rest of the tree nothing. I have a Seek-no-further tree that stands right by my tool shed that has been bearing on the even years and nothing on the odd year. I stood right by that tree and had the man pull these apples off as I told him in July. When I got the fruit in the fall I had eight bushels of medium size. The next year, to my surprise, I got six bushels of great, big Seek-no-further. The next year we thinned them again and we got eight bushels; the fourth year we got six bushels again. Then we got that tree so it came out just about even. I have 100 trees in

this orchard I described to you of Baldwins that have always borne the even year, and nothing doing the odd year, except possibly a limb here and there. By that plan I got that 100 trees up to 200 barrels the odd year, and then I fell down. My men struck. Did you ever have any of your help quit on you and say they would not do a thing? Well, that was the way with me. We were late with our thinning—it was in August—but we got our men started picking the apples, and I went to Niagara Falls to the International Fruit Shippers' Association. While I was gone the foreman goes through the orchard and finds the men all sitting on the ladders. He says, "What is the matter; can't you do the work?" They said they had made up their minds not to pull off another of those apples. "They are all good and we are not going to pull off any more of them." Well, he told them to put their ladders away. I got back well into August. It was late and the apples were all good. I took my chances, and I am set right back again to fifty barrels, or possibly 75. It can be done by heavy feeding of potash and phosphoric acid, trimming the trees and thinning the fruit. It can be done a great deal easier on young trees than on old, but you can effect the old. Now with that orchard I told you about I run about 1500 to 2500 barrels of Baldwins just as regular as the year comes off the whole 25 acres. I have more Baldwins than anything else—more than all the other varieties put together. If anyone wants to ask a question, just ask them.

DISCUSSION.

Mr. Marvin: How far apart do you thin these apples?

Mr. Case: When you can see what the June crop has been we thin one on a cluster, leaving one or a couple. Then we go right over them the second time and do that four to six inches.

Mr. Bassett: What is the object of that second thinning?

Mr. Case: I find a lot of things the second time over that I have missed. You can tell early just when you want to thin. We start on one variety. The first variety will be Wealthy, then probably the 20 Ounce, and then the Greenings and then Talman Sweets and possibly a little on the Kings, and along up to the Baldwins. By the time we get through with the Baldwins we go right back to the Wealthy again. The Wealthy has to be thinned over and over again. We had quite a joke this year over our Wealthys. When we brought them in the first time we took in one-half. I was not satisfied at all and sent the men over again to take one-half of what was left. Then it run along and I was not satisfied yet, and sent them back to take one-third of them yet. Now what proportion of the apples that were set were left on the trees?

A Member: Do you thin the Duchess?

Mr. Case: I have no Duchess bearing. I certainly would thin any apple. I have 450 trees of Duchess that are just commencing to bear. We went over them this year and didn't do any thinning. We are not in the Duchess section.

A Member: Have you ever thinned any before the June crop?

Mr. Case: Some of our people are doing that.

A Member: Would you get more of a crop the second year by taking off half the blossoms?

Mr. Case: How would you get the blossoms off?

Member: Pick them off.

Mr. Case: I wish I had brought the figures that it has cost each year to do the thinning. Last year—1912—think it cost me the most; I think possibly \$370, but we had the pink aphid very bad.

A Member: Did you have them the second year?

Mr. Case: A few. I started out the second year fully confident that I could handle the pink aphid.

Mr. Wilken: We had them in 1912.

Mr. Case: My idea was that we would not spray. They come under the lower limbs first and I would not spray the tops of the trees, but we put a man ahead to locate the lice and he told them where to spray. You understand that under normal conditions the lady bug and larva are there and that they are feeding on the aphid, and that anything that will kill the aphid will kill them a good deal quicker, as the lady bug and larva are right in the open. Teets Bros. of East Williamston had one orchard sprayed nine times with everything you can think of, and if you ever saw a poor crop of apples they had it. The more they sprayed the worse the apple crop.

A Member: When did they spray?

Mr. Case: Soon after the bloom crop.

A Member: If you spray at that time can you control it?

Mr. Case: We tried it. Of course the green aphid we don't care much about. It is the pink aphid we care about. The most feasible thing I've struck yet in regard to taking care of Rosy aphid was done at Homer L's who has a farm on the lake shore. He has been very successful there growing fruit. Last year in that part there was quite a bit of pink aphid, and when he found them on the trees he immediately telephoned to Ithaca—to Cornell—for the entomologist to come right there. He showed it to him and he said to use kerosene emulsion or whale oil soap, "Well" he says, "Case last year sprayed and sprayed with that stuff and so did the Teets boys, and we have no one in the country who does more thorough work than they do, and I haven't a bit of faith in it. Now tell me one thing, how long before these lice that are on these lower limbs will have wings and fly to other trees and have eggs?" He gives him ten days. He calls a couple of men in and they get a pair of shears and a grain bag. They got underneath and got these leaves off and put them in a bag, and he says two men covered this orchard in a short time and then went over it again. He burned these up and that was the end of it. I don't believe there is anything else.

Mr. Rogers: You have no trouble with the leaf hopper?

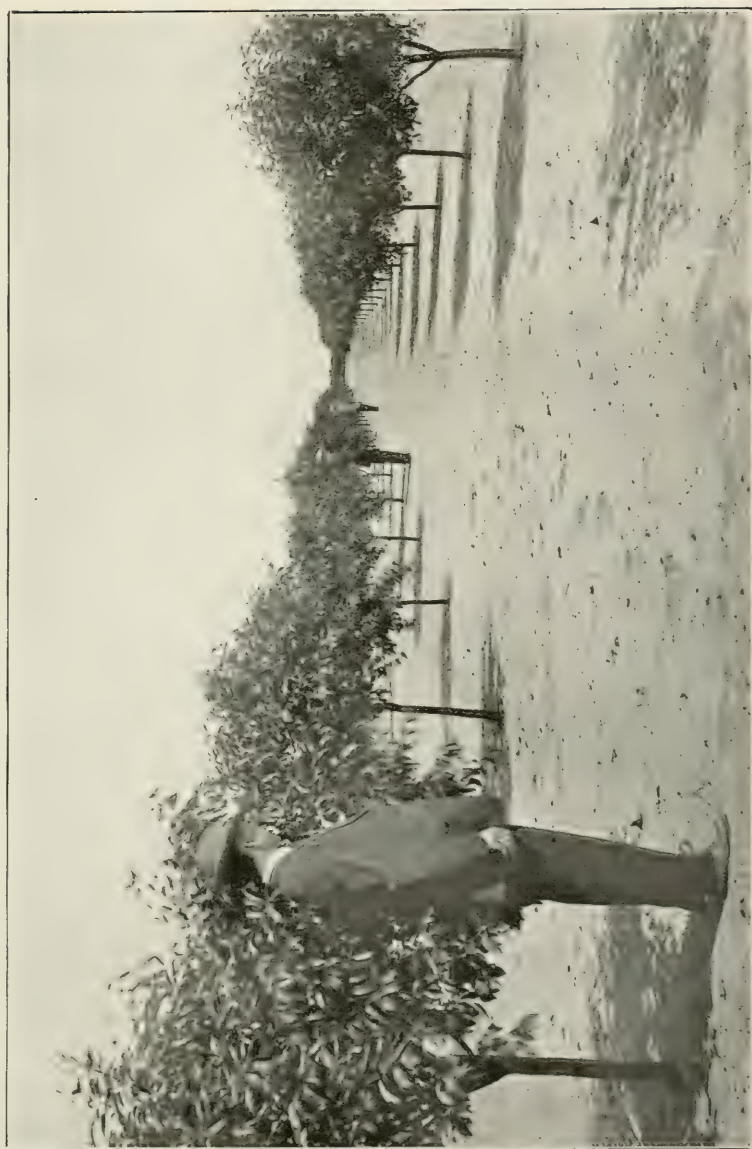
Mr. Case: On the apples, no.

Mr. Sherwood: I would like to ask, Mr. Case, if it was economical to set your orchard as your father set it with peach trees?

Mr. Case: Now we will suppose that orchard was set two rods \times 3 rods. You have them a long ways apart and you are going to try and do something with that land. Now will you please tell me at the price of labor today what you can put between these trees to get a paying crop. Tell me what it is besides berries. You may take potatoes or beans or corn or any of these things.

Mr. Sherwood: How about peaches?

Mr. Case: I don't like peaches in an orchard. There are several objections. One is, their cultivation is not the same; it is very different than on an apple orchard. Another thing, the spray is different and it is



Four-year-old Cherry Orchard of J. W. Markham, Elmwood township, Leelanau county.

almost impossible to spray these trees with lime and sulphur and not touch the peach trees, and it is too strong for peach trees.

A Member: Would not peach trees be better in there than apples even if you did touch a leaf occasionally?

Mr. Case: It is possible.

A Member: What would be the objection to peaches if the crop is larger?

Mr. Fralick: What is your objection?

Mr. Case: I believe that an apple tree is like an animal in this respect; that during the months of incubation it must have the best of care; that is, during the blooming period, which are the months of April, May and June, while the tree is forming its blossoms—getting ready to form the buds—that is the critical time for that tree, and during that time it must have plenty of moisture and plenty of good feed that its roots can get hold of to support that tree during that time. (Does not believe the land should be used for other things at the expense of your fruit.) We commenced seeding down in August. We have got way back to June 10th when we start picking these apples orchards, and that varies a little. We depend entirely on the time we shall seed by the color of the foliage.

Mr. Fralick: What time do you commence picking?

Mr. Case: June 10th or 15th.

A Member: Isn't it as desirous to have a big, healthy growing tree as it is to have the fruit? If you don't get your tree large enough to bear fruit early are you not ahead?

Mr. Case: I think that tree is like an animal. If you let a heifer have a calf at two years old and another at three and at four by that time you have a good cow. If you don't let a heifer have a calf until she is three years old you have turned these elements into making flesh. It is the same with an apple orchard. You want to get the fruit bearing early, and we have proved it very successfully.

A Member: What do you estimate is the profit on an apple orchard at maturity?

Mr. Case: Our Commissioner of Agriculture, who is in Iowa now, came after me a year ago last winter to give a paper before the New York Agricultural Association, of which he was then President. I think I started with 1906. Now here are the gross receipts of 1906; here are the expenses of 1906, and here is the net of 1906, and the same with 1907 and 1908 and for six years. What he wanted me to show were the gross receipts, the expenses and the net of a period of years, claiming I was the only man in the state that could do it. I started keeping books double entry, and as I look back to it now that very fact is what started my turning grain growing into fruit growing. I have a system of cards from which I can tell what is done every day; who has worked for me for something like fifteen or sixteen years, etc. Now you get at the end of six years and you have the net profit for the six years. Divide that by six years and it gives you the average net per year. We divide that by the number of acres and it gives you the average net per acre per year. That is what I gave him for the different fruits—apples, peaches, plums, grapes and cherries. I found that from \$1.00 to \$1.25 was what it cost me to put a barrel of apples on the car.

A Member: Does that include the package?

Mr. Case: Yes, to put them on board cars. Now Mr. Bassett asked

me "How about your overhead expenses?" Now we have an account we call farm expense that has to take care of things that we cannot charge to anything—insurance, taxes and the foreman's time you cannot charge to any one crop, and the up-keep of the buildings and tools, and looking over that account when we were ready to get it for the commissioner we found that quite a bit was charged to that account that should have been charged to farm improvement. I have ten carloads of sewer pipe buried underneath my farm, none of it less than ten or twelve inches in diameter. Now that should not be charged to farm expense—it is farm improvement. Now we thought one thousand dollars a year would about even up what legitimately belonged to farm expense, so we divided one thousand dollars by 85 acres and apportioned it between them.

Mr. Bassett: I was interested in the relative profits of the different crops you raise in New York.

Mr. Case: Grapes \$35; peaches \$55 net per acre. I wish to speak about these peaches. There was a heavy body of woods between them and the lake, and I lost my peach crop there, but later I took these woods out of the way. In the year 1907 we had peaches on the table a couple of times, and we had all the expense of caring for them. Plums \$74; pears \$98; apples \$124; cherries \$174. This whole report is published in the proceedings of the New York State Agricultural Association of that year.

Mr. Bassett: Were those sour or sweet cherries, or both?

Mr. Case: Both.

A Member: What was the relative cost of production?

Mr. Case: I cannot remember. I want to tell you that when we got these nets together there were a lot of interesting figures, and they were a great surprise to us. I was surprised to find peaches \$55, but there were my books showing the gross receipts, the expenditures, etc. I took it for the six years and we could not get around it, and I was surprised.

A Member: Do you think pears?

Mr. Case: If they need it.

A Member: How many failures did you have on your peaches in six years.

Mr. Case: There were about twenty acres of these peaches in all, and there was about ten acres of it that would produce, but we had to charge up the twenty acres.

Mr. Allyn: I just wanted to ask a question. You spoke of this timber screen. I don't really understand all the principles. It seems that the timber screen would help the fruit, and at the same time we know it prevents the carrying of moisture laden winds through the orchard, and we all know we get a cooler temperature if the atmosphere is not moist.

Mr. Bassett: I think it is a fact that is not disputed that we need air drainage for several reasons; it is almost as necessary as water drainage.

Mr. Case: In 1895 we had a very cold Northwest wind when the fruit was in bloom, and the thermometer hung around 34 or 36 all day long, and the only apples or fruit we had in 1895 was close to the lake; then we went twenty or thirty miles south until we got in the chain of lakes that goes through the state and there along these lakes we had some apples, and we could not find any apples between there and eastern

Ontario except you got east of the hills or east of a piece of woods.

Mr. Sherwood: About estimating your profits over a period of years. Would 50% of your gross be profit and 50% expense? About what proportion is it?

Mr. Case: I couldn't do it as cheap as that. Over one-half is expense.

Mr. Sherwood: Did you have half of the profit on the black board?

Mr. Case: I had the whole of it.

A Member: Where do the men put your apples when they are thinning them?

Mr. Case: On the ground. We are in the evaporating section. (Told how he used to pare apples when he was a little boy and that they used to dry about two bushels a day). Then father got one that would dry five bushels a day, but we stood sorrowfully by one day and saw our dryer that would dry five bushels per day go up into smoke. Then my father got the idea of a dryer that would dry fifteen bushels per day.

I was asked to go down to Detroit and talk on evaporated fruits, and I told them that as near as I could get the figures the Northern part of Wayne County had produced 800 carloads of evaporated apples. Now in order that you may fully appreciate this vast amount I will say that, allowing 600 cases per car, we have 480,000 cases; allowing 50 pounds per case we have 24 million pounds; allowing (—) pounds to the pie we have (—) pies; allowing a pie to occupy a full space we have made apples enough last year in a territory fifty by thirty miles to make a string of pies across the continent to Liverpool, and another string from Boston to San Francisco, etc., continuing a line on to Hawaii and Manilla and still on, and we have 540, pies left for a fruit growers' feast; in fact, we only lack nine million pies to encircle the globe.

A Member: Do you consider it necessary to put pears in a block?

Mr. Case: I have a small block of Bartletts. (Described pear orchard.) We had a bad job with the pears. They ripen late and we lost them. We have grafted them all over to Bartletts. The Kieffers are still in there. I grafted a few into (——) a late summer pear that we pick with the black caps, and we get a very fair price for them. The Kieffers we have never found anything they make a good union with.

A Member: How do you like the Kieffer?

Mr. Case: I don't like them.

A Member: Is your section anything like the Hudson River section?

Mr. Case: No, we can grow good pears there. The only Kieffer orchard I ever saw in my life belongs to Mr. Morrill of ——— and he is growing some good Kieffers there. We are growing one but not as good as his. We are making money on them, but I am expecting the time to come when people will not have them at any price.

Mr. Kendrick: Have you any trouble with summer blight in the pear?

Mr. Case: Yes, a little.

A Member: Was it bad this year with the Kieffer?

Mr. Case: No, not so bad with the Kieffer.

A Member: How do you control blight in a pear tree?

Mr. Case: Cut it out and wipe the stem with corrosive sublimate. The first infection is always during the bloom, and if you get it in time you can check it, but if it gets by you and gets on the new growth you will have trouble.

A Member: I have some Kieffer pears and I am proud of them. I

have let them stay on the trees late so they ripen up in good shape and they are good eating.

A Member: They are one of the best pears for canning also.

A Member: What do you do with the apples that are thinned out?

Mr. Case: At the time we thin the apples are not good for anything. We are in an evaporating section, and when we were first thinning these out we waited until the last of August or 1st of September to do this in, and then would run them through the dryer. My records show at that time that the first year I did that my accounts show I was \$250 winner, after taking out my expense of thinning and gathering and running through the dryer I got \$250 more than it cost me, but I was convinced that I had done nothing to the balance of the fruit.

A Member: In your thinning do you figure that you shorten your crop for that year?

Mr. Case: No sir.

A Member: You get practically the same crop you would have had anyway?

Mr. Case: Yes I do, but you have to stick right to it year after year.

A Member: If necessary, you are willing to sacrifice some of the crop?

Mr. Case: You don't have to. You will have just that many bushels. You won't have so many for drying and canning but more bushels.

A Member: My experience is, if you don't sacrifice they won't come back another year. Won't you get a lot better crop the second year if you sacrifice the first year?

Mr. Case: I think that some of them do. I never done it.

Mr. Munson: Don't you take into consideration the fact that when you get apples the off year you get a better price for them?

Mr. Case: Sometimes, but the price is governed by the amount of apples all over the United States, and it has gotten so the price on the even year is not much lower.

Mr. Bassett: Are all orchards alike on the odd and even year?

Mr. Case: No, orchards are different. Now, we are thoroughly convinced of another thing, and I want you to try it out. During all these years if we have a lot of wet during the blooming period and our bloom don't set, they say it is too wet—the pollen has not been distributed. I don't believe that. Every blossom has the fine pistil in the centers; you have the stamen standing right around it. The blossom leaves are outside of them, and a nice breeze will blow that over there and you have ten days to do it—not ten days for one blossom, but ten days from the time there are blossoms on the tree to be fertilized, and if you get one blossom in twenty you have a crop of fruit. The trouble caused by the wet is the fungus. W. W. Whitsell, our New York man, found winter fungus was not on the trees but on the leaves on the ground and all they needed was a warm wind, when they would burst with sufficient power to shoot the spores into the air, and the first infection was on the blossom leaves and stems, and what we laid to lack of fertilization was this fungus, so we should get our spraying on before the bud opened.

Q. Is summer pruning of young trees desirable in this state?

Mr. Wilken: I think in cases where trees are a little slow in coming into bearing summer pruning right after the terminal bud has formed, late in June or July, might be a good thing, but under ordinary cir-

cumstances where an orchard is doing very well as far as bearing is concerned I prefer the spring pruning. Summer pruning will tend to check growth to some extent. You will generally find the fruit buds on the short growths, and where there are many long growths or an unusual number of short, stubby growths we would have better bearing by summer pruning.

Q. Can we afford to support the plan of the Apple Shippers' Association for advertising the apple, by using their stamps on packages?

Mr. Bassett: The purpose of this Association is trying to advertise the apple. They feel that it is necessary to advertise the use of the apple. For instance, they put out cook books of 157 varieties of recipes—no 197, I guess I got mixed with Heinz pickles, they also intend to use this money to advertise the use of the apple—the fact that apples are healthful, that they can be used in many ways and in every way possible encourage the use of them. Now the President has explained just exactly the plan. The producer of the apple should purchase from this Trust Company in Baltimore stamps to be applied to the barrels and boxes as packed. It is not intended or expected that the stamp upon the package is going to be any guarantee—it is simply going to mean a revenue just like internal revenue stamps. The question is, can we afford to support that plan. We expected to have (———) to discuss this with us this meeting, but he could not be here. The hope is, to raise money to advertise the use of the apple. We are all anxious to have our goods sell, and there has been a tendency in the past to keep out the apple supply by using such fruits as grape fruit and oranges, etc., and to get back on a good foundation we have not only got to pack and grow a good apple, but we must educate the people to buy these apples. Personally, I feel that it is a good move, and if this money is well expended that is received for the sale of these stamps, we will all get a benefit from the increased demand for these goods. Now this plan is not new—this idea of advertising the apple. The rice growers of Louisiana and Texas have conducted rice parlors and rice restaurants with the idea of teaching people how to use rice, its edible qualities, etc. The orange growers of America have done a certain amount of good in increasing the sale of their oranges by advertising them, and the same with other fruits. Now it is hard to say how this is going to be done. You might buy stamps and put them on your boxes and barrels and support this movement, and your neighbor would not have anything to do with it, and he would get just as much out of this as you. They are asking us to support it, and I see no reason why we should not.

Mr. Munson: I understand the advertisement will go into every house in the country and get people to thinking about apples.

Q. My neighbor sprays his orchard in a careless way, but the scale from his orchard spots up my fruit. What remedy have I?

Mr. Geo. Friday: I think the neighbor will kill himself off in a short time, and it doesn't make any difference to me whether he sprays or not.

Mr. Wilken: We have the state law that will take care of that. It is one of the things that is very hard to follow. The law requires that a man has to take care of his trees or they will be destroyed, but if the proper authority in the township starts anything like that in one place he will have to start it in the whole township, and is liable to create enmity. It is a law that is very hard to carry out, but we have the law.

A Member: If an orchard was infested in the neighborhood with

scabs what effect would it have on an orchard that is sprayed and what distance?

Mr. O. K. White: I could not say definitely along that line, but my idea has been that there is not a great deal of danger of a neighbor's scale affecting your orchard. The wind might carry it, but I don't believe it is any where near as bad as the sparrows carrying scale.

Mr. Bassett: About the neighbor not spraying his orchard, there is a difference of opinion on that. A couple of men came to me, or three of them, in our neighborhood who were thorough sprayers, good men in every way, but in the division of the orchards, right over the fence, there were some trees infested by scale, bought by a city man. He buys a solution and an outfit and sets a single man to squirting around the orchard, I would not call it spraying, and he thinks he is living up to the law. My neighbor is a great grower. He had taken a great deal of pains to produce a fine crop of Greenings, and at the last end of that season when he thought he had a fine crop, there comes this scale from his neighbor's orchard and spots his orchard so his apples were very unsalable. Now the law says that his neighbor must spray or destroy his trees. Now, he thinks he has sprayed but he did not do a good job. He was told by the real estate man that he could clean up that orchard for fifteen dollars. Down there our real estate men sometimes make mistakes, and some people get mixed as a result. I know the commissioners should take care of this, but it is a serious problem when a man has spent thousands of dollars on an orchard and then has it infected by his neighbor's infected orchard. Now can we enforce that law or are we helpless. The law says a man should thoroughly spray—I am not positive about that "thoroughly" but he should spray. Because he attempts it and has the solution thrown in the air does not absolve him from liability, and I think he is liable for damage. I am not smart enough to answer the question, but perhaps Mr. Smythe can solve it.

Mr. Smythe: When Mr. Bassett asked me to talk on the laws I read up the laws on yellows in peaches and the scale, and the law is very weak. I think our fruit laws are all very weak. We get good enough laws but we are handicapped. In regard to the scale and the yellows in peaches, the township board appoints a man to go around and inspect these trees, and they give him the large sum of \$2.00 per day for this work. Now there is no man that is willing to go around through the orchards of his neighbors and create enemies by enforcing this law for \$2.00 per day. I think the laws are very definite but they don't go far enough. It is the same with the new package law and the new marking law. There is nothing behind it. I think that is where the laws are lame; we have them, but no one to enforce them.

ESSENTIALS IN COMMERCIAL VEGETABLE GROWING.

BY W. S. PALMER, KALKASKA, MICH.

In considering the "Essentials of Commercial Vegetable Growing" we must deal with them for the most part under two quite different heads; namely,—whether we are growing vegetables for the general or open market, or catering to a particular or special market. In the former, our products must compete with other like products on the open or general market; while in the latter, they are shipped direct to particular customers, thereby removing them from the general competition to which they are subjected in the former. The chances taken are far greater in the former than in the latter method of marketing.

In dealing with this subject today I prefer to speak from the standpoint of the grower who caters to the special markets, for several reasons: as this is the phase with which I am most familiar; the one most often overlooked at our horticultural meetings; and the one that is destined to come to the front here in Michigan owing to the high quality of our fruits and vegetables.

Some years ago I conceived the idea that the resort towns of Northern Michigan, including a portion of the Upper Peninsula, offered an excellent opportunity for one in the "small fruit or vegetable business" to supply these markets with fresh fruits and vegetables direct from the grower. I therefore gave this matter considerable thought during my last two years in school where I devoted considerable time along horticultural lines. Upon completing my course I began at once to look about me for a good location for the growing of fruits and vegetables. The more I thought the question over the more impressed I became that the markets which lay to the north of my own home offered, that which I afterward found to be true, an excellent market for just the products which I wished to grow.

I first secured forty acres of good improved land close to a shipping station with two railroads which led into the territory I wished to reach. The land for the most part was well drained, free from the late spring frosts, rich in decayed vegetable matter, but rather rolling. I first set out twenty acres to tree fruits on the more rolling portion, retaining the more level portion for the growing of small fruits and vegetables. I afterward purchased another forty acres of land more level and better adapted to the growing of vegetables than the former where a strong quick growth is required in the early spring.

No one can start out and grow vegetables altogether from books. We must first secure the proper locations with regard not only to the surrounding climatic conditions, lay of the land, and character of the soil for our particular needs, but as to the size and character of the markets within reach. Moreover we must have some liking for the business if we expect to succeed in this as in another line of work.

One has to study their soil and work with it some time in an experimental way before he knows just what soil is best adapted to each and every crop under certain surrounding climatic conditions. It has been my experience, where the season is short and we want a strong, quick

growth, that a good sandy loam rich in decayed vegetable matter is far better than a heavier soil. We want a soil, rich in plant food, one that will warm up quickly in the spring, and one that can be readily worked soon after a rain without injury.

For certain crops such as tomatoes, peppers, early cauliflower, and cabbage it is quite necessary that we grow our plants in hotbeds of some sort. Especially is this so if we are after the early prices for our products which are almost always higher than later in the season. It may spell success or failure for one in the business.

Hotbeds are almost an absolute necessity to one in the vegetable business in this section of the state when catering to the northern resort trade. They need not be an elaborate affair but simply one in which the grower may start his plants early preparatory to transplanting the same into the cold frames or field. The greatest difficulty we have found with the ordinary hotbed where extra early plants were wanted was the damage from cold winds when transplanting and caring for the plants during the month of April.

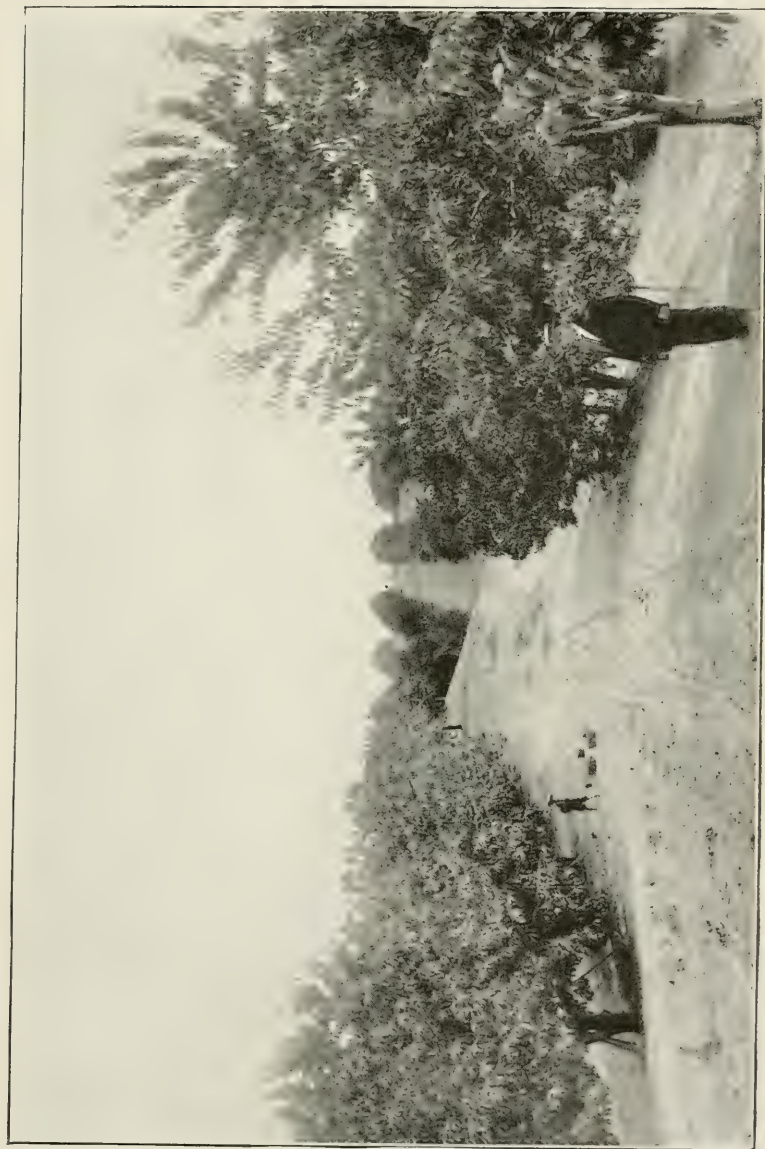
To overcome this danger we constructed a long structure 11'x42' even span and used our same 3'x6' sash on this frame-work. This width left a wide bed on each side with room to walk through center under the peak. We dug a small cellar at north end of structure 12'x12' by 8' in depth which was used as a workroom for transplanting. This cellar also contained a large brick arch which furnished the heat that was carried through under the two beds and out at the south end of the building. While the heat was not as uniform as in the old style hotbed, yet the plants had all the sunlight available and the transplanting could be done at just the proper time regardless of the weather outside.

Good seed is one of the prime essentials in successful vegetable growing. It should be fresh, strong in its germinating qualities, and of the proper varieties to satisfy the needs of your customers.

My experience in this northern section of the state has been that the extra early to medium varieties of vegetables will yield far better profits than the later varieties. This might not hold true were one selling on the open market as the later varieties usually outyield the earlier ones and the work of growing the plants is much less. In buying seed it is essential that we secure the best obtainable. When your seedsman comes to know that you want only the best and that you are willing to pay the additional cost to secure the same he will make a special effort to satisfy your wants. For this reason it pays one to select a good reliable seed firm and stick by them from year to year in the purchase of seeds.

The choice of varieties is a local matter. One must become an experimenter as well as a grower if he would succeed. He must test out his varieties under certain given conditions with some given purpose in mind that certain varieties may be selected that best fulfill the given local requirements as to soil, climate, and markets to be reached.

The matter of having good plants is one of the prime essentials of successful vegetable growing. Plants should be strong and stocky when transplanting from a hotbed or coldframe. Those plants which have been transplanted from two to three times receive but a slight check when transplanted to the open field as compared to the soft slender plants which are grown closely together and have poor root systems.



The famous Paul Rose orchards near Elberta, Benzie county.

The proper condition of the soil, likewise favorable weather at planting time is also very essential. The soil should be in fine tilth and warm before transplanting, otherwise plants had best remain in cold-frames a few days longer. I have transplanted tomatoes and peppers to open field as early as the 18th of May and as late as the 7th of June and still began harvesting ripe tomatoes the latter part of July by having large, stocky, heavily budded plants ready to set out into the ground the minute the weather looked favorable.

As far as cultivation is concerned we all know that this is very essential to any growing crop, not only to conserve moisture and keep the weeds in check, but with vegetables where an extra quick growth is required, it is exceptionally so. One or two applications during the early part of the season of a commercial fertilizer rich in potash and phosphoric acid when the soil is already rich in decayed vegetable matter will hasten the growth and likewise improve the quality of the crop.

The use of bordeaux on the tomato is quite essential to prevent blight. Have made a practice of using arsenate of lead with the spraying of bordeaux in combating the potato beetle and tomato worm. Cut worms are quite a menace in the early spring when plants are small but are readily taken care of by the use of poisoned bait scattered upon the ground either before or immediately after sowing or transplanting into the field as the case may be.

Some growers advocate the staking and training of tomatoes but our experience has been that, while they ripen slightly earlier and are less subject to rot, yet the results obtained would not warrant the extra expense except on a small scale.

In the growing of vegetables for special markets the work is only half accomplished when the crop is grown. It requires considerable tact on the part of the grower to seek out suitable markets for certain products after they are carefully harvested, graded, and packed for market.

Special care should be exercised in the harvesting of vegetables, that they may show up good by the time they reach the consumer. Especially is this true with such crops as tomatoes, peppers, melons, and cauliflower. Tomatoes in particular must be picked at frequent intervals so as not to allow them to become overripe. This also holds true with other vegetables but not to so great an extent.

It is very necessary that we have a good seasonable product, uniformly graded, well packed in attractive packages, and every package guaranteed, to make a success of growing vegetables for a special market. Your products must be of such quality and attractiveness as to not only hold the markets already obtained, but also create new ones in adjacent territory. Herein, the catering to a particular market necessitates extra labor and tact on the part of the grower to make a success of this method of marketing. While the expense is some greater, yet the consumer expects and is only too willing to pay a few cents more for a product that he knows is good.

We should exercise the same judgment in the grading of vegetables as with fruit, by making from two to three distinct grades of the same. How many do? Careful systematic grading is one of the prime essentials under this system of marketing and one that is becoming more pronounced from year to year.

Special care should be exercised in the selection of a neat attractive package suitable for the particular product in hand and one which

will be capable of transporting the same safely to its destination. The six basket peach carrier is about the most suitable package for fancy tomatoes. We have used this package entirely for the early and medium varieties for the past ten years and are well satisfied with its merits. In our experience with peppers we have found the half-bushel and bushel basket to be the best. Peppers as well as tomatoes must be packed in uniform layers from the bottom up to the top of the basket and not dumped in and faced over the top to make an attractive package.

The old adage, "That the Package Sells the Fruit," is in a large measure true with vegetables as with various other products. A small neat package of vegetables properly graded and packed is certainly attractive and brings the price.

Musk melons, sweet corn, cauliflower, and early cabbage are best shipped in a slat crate having solid ends to give it strength. The placing of a sheet of wax paper over each head of cauliflower when packing adds greatly to the attractiveness and quality of the same upon arriving at destination.

There is always a good market for early radishes, beets, carrots, and onions. These should be carefully washed and tied in small bunches by raphia and packed in crates for shipping. The ready sale for such products depends largely upon the neatness and attractiveness of the package and contents. Peas, beans, kohlraba, and swiss chard are all popular vegetables and find a ready sale in a particular market.

The new fruit package law brought about through the persistent efforts of prominent members of this society of ours in session here to-day, while it will be of untold benefit to the fruit-growing industry of Michigan, it will also to a certain extent tend to improve the standard of quality of the vegetables placed upon our markets.

A few dollars spent during the season for attractive labels placed upon crates and individual packages as well is money well invested. In catering to a special market the matter of labels is an absolute necessity to the commercial grower. He must have a label of some description. Too few growers realize the full value of a neat attractive label with the name of the farm, the grower's name and address, the variety and grade of the article contained, and a guarantee as to the quality of the same. A neat attractive package with the contents properly graded and packed and with some such label as mentioned is absolutely essential to gain a reputation for your products that will be lasting. What does a few dollars spent in such advertising mean to gaining a reputation that will give your products prestige over others on the same market? Your vegetables will sell readily after your trade is once established while the other fellow must take his chances.

A narrow label with some such wording as "Fancy Products" or "Our Best," the name of the farm, the grower's name and address, may be placed across each basket of tomatoes in a carrier at a slight expense, thus adding much to the attractiveness of the package.

Not only this, but when Mr. Brown sells Mrs. Smith one of these particular baskets of tomatoes and she in turn tells Mrs. Jones, her neighbor, about what fine tomatoes Mr. Brown is selling and will be satisfied with only those with your label, you are not only gaining a better reputation for your products, but a much larger volume of business.

We have always made it a practice to label all of our crates of fruit and vegetables with a good substantial label as previously described. We also placed a neat white label diagonally across the top of each box of strawberries and raspberries and one somewhat larger across each individual basket of tomatoes and peaches. The waxed paper placed over each head of cauliflower also carried a printed label. We found that it paid us well for this extra expense. We secured a reputation for our fruits and vegetables through this method of advertising that after the first two years we were swamped so to speak with orders, many of which we were unable to fill.

A vegetable grower who caters to the special markets must of necessity be a good grower and an exceptionally good marketman, as it is just as essential to thoroughly understand the marketing end of the business as that of growing the crop in the first place.

Time will not permit us to go into detail regarding many of the essentials of commercial vegetable growing at this time so I am not going to touch upon the importance of transportation facilities in the commercial vegetable business as this is a broad subject of itself.

It is safe to say that commercial vegetable growing bids fair to become a prosperous business along with commercial fruit growing here in Michigan. While it has not been given an equal amount of study and attention, yet from what experience I have had along this line here in Northern Michigan, I feel convinced that it is destined to become one of the leading industries of the state in the near future.

DISCUSSION ON "ESSENTIALS IN COMMERCIAL VEGETABLE GROWING."

A Member: Are potatoes fruit?

Answer: The definition for Horticulture is that part of agriculture which produces food for the people directly. Not raising hay to raise steers for meat, but the raising of fruit as a food or vegetables as a food. When he does that he is a horticulturist.

Mr. Gibson: They are twitting me of being an Irishman. There are two things I am proud of. One is that I was born in Ireland, and the other is that I left it just as soon as I could.

A Member: I am another Irishman. The potato is called the Irishman's apple, but I raise more of the American apples.

A member: I would like to get more information about the potato blight.

A Member: I want to know something about the blight also.

Mr. Palmer: I have had little experience with potatoes, but will say I have sprayed a couple of years, I had quite a few in, with Bordeaux mixture. There was blight all around us and I was free from it.

Mr. Morrill: That is a very important question because it is gaining on us. I have been thirty-five years a commercial potato grower. I was run out of it in Michigan by this same blight. I would like to see spraying a success because I am interested in spraying products. I go back periodically and try it again, thinking perhaps my farm, after keeping potatoes off for a few years, would be all right. This year I went back with 18 acres and I got it in the neck again. I have never seen a man stop blight, and I have seen it tried repeatedly. When the country is new and adapted to the potato crop, it becomes a prominent crop, but now countries that did this are troubled with blight to such

an extent that people quit that crop and are buying their potatoes. In the west there are wonderful valleys that are great producers for a time, and then this disease gets hold of them and they quit, and a new country furnishes a supply.

Mr. Gibson: How do you account for their growing potatoes so long in Ireland.

Mr. Morrill: The Irish are pretty bright people and they probably succeed where others don't. I wish someone would tell me if they have succeeded for a term of years where blight was prevalent. I have seen some farms under some conditions have a nice crop of potatoes on land not so good as that on which I lost mine by blight.

Mr. Munson: I heard a man saying something about getting four hundred bushels per acre and sprayed often.

Mr. Morrill: I have worked a long time on potatoes, and I would go a long way to find out about this thing.

Mr. Smeltzer of Benzie County: Speaking about potato blight, I have not sprayed except for the beetle myself, but some of my neighbors are quite heavy potato growers, and some of the men since they have begun to spray for potato blight have had good crops.

A member: (Mr. Morrill) It is the early blight we have. Part of my patch was all right, some of them were still green and some of them were bad. I would like to know how to control this early blight.

Mr. White: There are perhaps three different kinds of blight we have on potatoes. The early blight that Mr. Morrill has just been speaking about is very hard to control. The early blight is usually the most prevalent on early potatoes. There are many experiments in this state and in the experiment stations that will give men considerable control on late blight that kills the vines off in a half week or such matter. It has a very offensive odor.

Mr. Morrill: The blight I mean is when the leaves begin to turn yellow. When you get the other you can control it.

Mr. Wilson: I have raised potatoes. And often times we would get from a peck to a half bushel in a hill. When the Colorado potato bugs were first talked about we had a man in our town who prophesied very solemnly that it was impossible for potato bugs to come in that country on account of Lake Michigan being between. But after a while I went down to the beach and saw a swarm of bugs that had drifted ashore in a swarm—the water was full of them. Where they came from I could never tell, but they were along the shore for two or three miles along Crystal Lake about four to six inches thick, and as soon as they dried they were ready for work, and we have been infested with them ever since. Now as far as using Bordeaux mixture for blight and bugs is concerned, I have sprayed for something over twenty-five years, from the first time I heard about it being necessary—sprayed my fruit trees and my potatoes for bugs—and these bugs succumb to paris green in reasonable good shape, and while some of my neighbors had blight I never had any. I keep up this spraying three or four times during the season, and they are always in good condition without any trouble.

A Member: I have been waiting for a point to be brought out. I understand this spray goes through a chemical change in about ten days (the Bordeaux), and is only active about ten days. I have found that when they sprayed, if they sprayed more often, the cost was more than

the good, but if they sprayed about once in ten days they were almost sure to control the blight if they sprayed well; often they have a spray outfit that doesn't throw it over the potato well.

A Member. A neighbor said he sprayed when his potatoes were small and controlled that blight.

HARVESTING AND PACKING OF FRUITS.

W. G. FARNSWORTH, WATERVILLE, OHIO.

I have been fortunate enough to visit Mr. Case's place and go all over his grounds, and witness some of the results that he obtained from thinning apples, and I want to say here this afternoon that they are remarkable. I don't know what he has told you, but I doubt if he has made it strong enough. I was also in his packing house, and pretty well over his premises, and it would do the eyes and hearts of any fruit grower good to see the sights I saw there. I am very much pleased to have the opportunity of meeting with this representative body of fruit growers. Knowing your Secretary as I do, I know he is a live wire among a bunch of others, and we expect to get something here before we go away.

Now, what I have to say this afternoon has been hastily prepared, being very busy at home, but I want to speak largely of our own practices and I hope you will pardon the personalities. I want each person present to be perfectly free to put in a question if they wish. The subject that I am to discuss this afternoon and one or two other subjects are very closely allied; for instance, the growing of fruit, the harvesting and packing and the marketing are three subjects so closely allied to one another that it is difficult to talk on any one without saying a little something about the other. In taking up this subject I might ask this question. When do we begin to prepare for the harvesting of our fruit crop? I am something like the party who said "if you want to know how a boy is going to do in life, you want to go back to his grandfather and grandmother," and to get something to harvest you want to go back to the planting of the orchard. In growing fruit commercially or for local market we plant several varieties that will not mature at the same time, thus giving us a longer season to harvest. If we were to plant one variety we would be limiting the time of harvesting. Then the pruning and training of the orchards by heading low. Our practice is to head our trees very low, perhaps from $1\frac{1}{2}$ to two feet, and in older orchards that have been planted from twenty to thirty years, where the trees have not been properly trained we have gone into these orchards with permission of the owners and cut them back quite severely in some instances, taking out several feet. The object is to grow the fruit where we can get it with the least expense, and prevent it from being injured by the storms and winds blowing it off. Following this preparation is the thinning. Now I don't know how extensively you are practicing thinning here. I hope very extensively from the results we have obtained in our own orchard, and Brother Case in his orchard. We know it not only increases the quality of the fruit, but it cuts out a large expense in harvesting. This includes pears, peaches, plums and

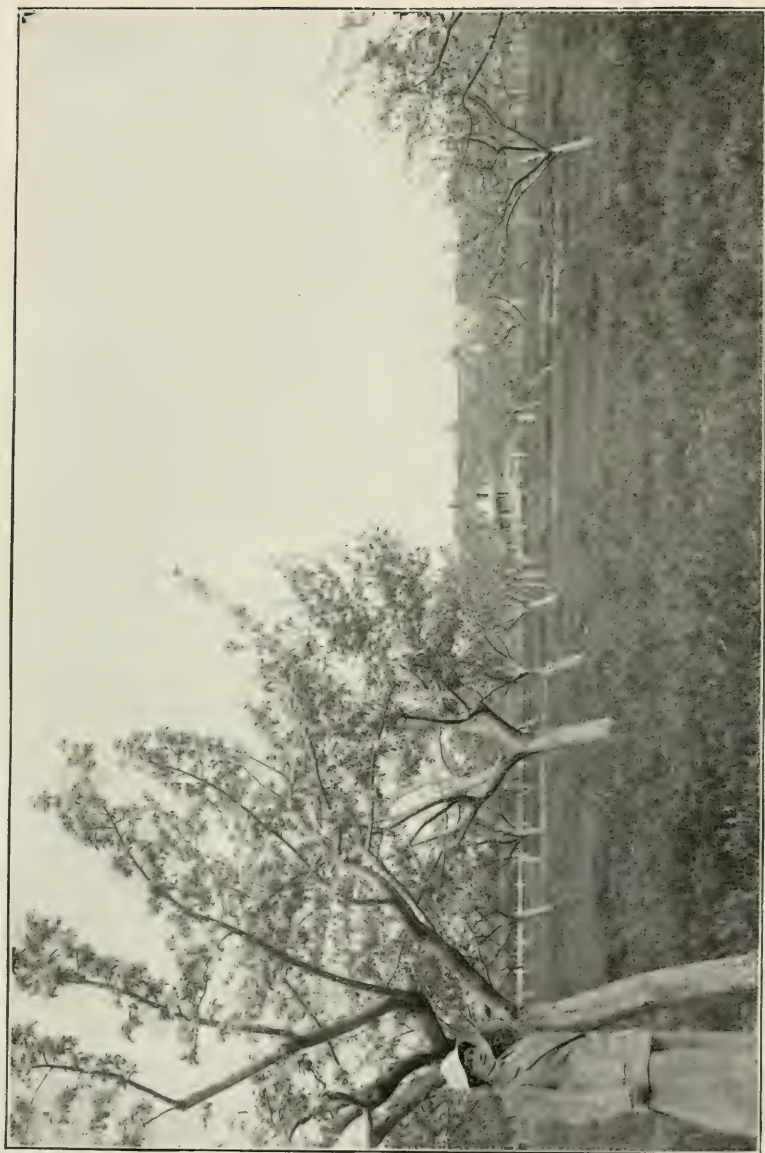
apples. By these methods we are preparing for the harvest. When harvest comes we have plenty to do. We have a short season, from two to four weeks, for apples, and a short season for peaches. Now we come to the harvesting of the products after we have properly grown them. I will speak just briefly of the equipment for the harvest. There are the ladders, and for our own use we use 20-foot ladders, which is the longest we are using, and of course the basswood ladders where the sides are spread well at the bottom and with a pointed top. We like the basswood ladders as they are very strong and rigid and light. The length of the ladder will vary according to the age of the trees and the size. We are using for peaches a four to six foot stepladder. They are one of the handiest ladders we have ever used in the orchard. They stand very solid on nearly all kinds and conditions of soil. We do not want a ladder that is in any way dangerous to get upon, or liable to turn and throw a man so he has to hang on with one hand—we want him to pick with both hands. We use baskets. In some places they use sacks, but we don't want a sack taken into the orchard. They do get in sometimes in the evening when we are not there. For our apple picking and pears we use the handled basket, and we are going to have these baskets with handles padded on the inside and I am satisfied it will pay us for the extra expense. You do not want to compress the fruit or drop it. For our peach harvest we use a Diamond market basket, just as firm as we can get. The half bushel splint basket, and they are not handled until they are ready for the packers. Be very sure to get a basket that is firm (you will have to order them made extra) and not fill baskets too full of the fruit, to injure those in the bottom of the basket. One of the important things to be considered in harvesting is supplying the packages. There is plenty of worry and anxiety without wondering where you are going to get your package. Then for the handling of the fruit after it is picked we use wagons with springs in them altogether. In fact, we like to handle our fruit like eggs, as it pays us to take care of it. Then after we have this equipment the question would be asked about the time of harvest. This is a very difficult question to answer, as to the condition the fruit should be in at the time of harvest. It will depend largely, practically altogether, on the market. Under our own conditions, we allow the fruit to become quite ripe. We find it has a better quality, a better peach flavor, when it matures on the trees. Too many are situated where the fruit has to be in transit two or three days or a week before it reaches the consumer. With us it may reach the customer or consumer within twelve hours from the time it is picked and can be better matured. It takes experience along this line of picking for good results. In apples we also require the fruit quite mature. In reference to the packing house I might suggest a word. This should be well supplied with tables, I prefer the canvas covered tables, where you pour the peaches or apples out as it doesn't bruise them, with the edges padded. After they are harvested, peaches of course want to go to market at once, the quicker the better. They want to go where it is cool and be handled and crated at once and started on their way to market. With apples it is a little different. We are handling ours in crates and barrels to get them to the packing house or storage. Our early apples we generally send at once to market. I wish to say right here that in growing early apples we do not do the amount of thinning we do on the later ones.

We sometimes go through the first time, thinning a reasonable amount and the second time just as soon as they will do for cooking, and in that way we get them on the market. Many times in harvesting these we will lay blankets on our wagons, which are low, and line them very heavily. Sometimes we do not pour them out, but simply pick them out of the baskets. We generally keep in the shade of one of the trees and pack them there for market, and they are taken directly to the railroad and shipped.

A few words now in reference to the harvesting of our winter crop. If any of you have a question at any time you may ask it. In the harvesting of our late apple crop we use a little different method. If it is possible, we avoid picking our winter apples when the weather is hot or muggy, close or damp, but there are times when we cannot avoid it; we have to get them off because they are ripe. Then we put them into crates and get them at once into the cold storage house or into a cool, shady place. We find the barn floor a good place. We never want to barrel our apples or put them into a package when they are warm or damp. I am satisfied that many of us have been making a serious mistake in this line. We have passed places where apples were picked and lying on the ground. I know of no quicker way to destroy a larger per cent of your apple crop than by putting them on the ground. It causes premature decay. If picked at the proper time and put in cold storage, they can be held in perfect condition much longer than you anticipate. I want to make this a strong point this afternoon. Don't lay them on the ground. The change in temperature and the moisture in the soil will make decay set in at once, and when you come to put your apples in storage you will find they are ready to go on the table. So let us make this a point to be observed. I might just say a word or two further in reference to picking our apples and handling them. If we have a large lot to handle, as a good many have, we like to divide our help into groups. We don't like to have too many in one squad. I notice when we get one or two men together we get pretty good service, but if we get too many together they seem unable to plan or manage just right, and there is not much work accomplished, so we like to divide them into squads of six or eight. But above all things, we do not want to hire our fruit picked by the bushel. While possibly we can get more bushels off by this means, we find that we also get far less returns for this fruit when put on the market. We have one of the squad serve as foreman of the orchard, and then visit each squad as often as possible. If we hear an apple dropping into the basket or on to the ground, we try to find out the cause. I realize an occasional one is dropped through no fault of the picker, but sometimes a picker is careless. Now if it is a light apple, like Grimes' Golden or the Yellow Transparent, you will notice in a few days where it dropped. Then in the picking we find there is a tendency among some of the pickers to not use the care they should to separate the apples from the spur, and some will tear off too much foliage or damage the body of the tree. By using a little care they can take hold of the apple and with a little upward lift separate it from the stem, but if they pull them down they sometimes damage the tree. It will take longer to pick a bushel, but the apples are worth something when you get them. We can never expect to get the prices that the Western producers do unless we handle the fruit like they do. I believe we ought to send them a vote of thanks

for waking us up, if we will only stay awake. They will have to find another market if we do, as we have the fruit that has the quality. I am glad to see that they are doing it in this section. I think that this is one of the most important questions, and I feel that I am not capable by a long ways of doing the packing of our fruit justice. In talking with one of the cold storage men from Cleveland a year ago he made this statement—that sixty per cent of the fruit in their cold storage house was from the West. Now I would like to ask each of you why this was the case. They cannot grow any better quality, and they can't grow as good. Then why? For this very reason—the dealers know what they are going to buy when they buy that box of apples, and they don't know when they buy a barrel. If you were going to buy for yourself, if you wanted a high grade article, you would want to examine a good many barrels of apples that were put up in that way before you bought, or you would expect only about one-tenth perfect fruit. Now when you buy boxes of apples you know exactly how many apples are in the box, and you know they are of uniform size and color. They are free from blemish; they are free from worm injury; they are free from fungus trouble and bruise. How many barrels could you buy in the same condition? Now I am not ready to say we should box all our apples, but if we expect to have our markets for ourselves, or have the first choice of our markets, even with the handicap of fifty cents for freight from the West, we will have to practice the same principle in the grading and packing. Now I believe we ought to put it up in a different style of pack because we grow a better quality and we don't want to advertise our Western brother by selling a good quality of Eastern apples and calling them Western apples; we want them to know they are Eastern apples and to want another box. Now I believe we can solve this question in some sections, in some portions of some states especially, by a co-operative marketing association. In our own state, however, our fruit interests are so scattered that it is going to be a difficult problem, but I will say more later on that subject. Now coming to our own fruit, especially in our line, we have followed the boxing to some extent but not largely. With us, bushels seem to be the best, and when we pack in the bushels we want to be very particular as to the grade. We are using for our own pack largely the 20-pound and bushel baskets, and even in packing into these we grade very carefully, and we try to guarantee to the man that is buying a basket of our fruit that they are just as good on top as they are in the bottom, and we also try and guarantee that they are just as good in the bottom as they are on the top. We place the rosy cheek up on the top, but we want the rosy cheek on all of them, so that the person buying comes back for more of the same kind at the same price. If we do not pack it properly we cannot expect results and success in a financial way from our fruit interests. It makes me think of the story of the father who sent his boy to market one winter's day with a load of potatoes in sacks. He came home at night with the potatoes and his father said "Did you sell them?" The boy says "No, I could not sell them." The father asked him if he tried and the boy said "Yes." "What did you do?" "Why, somebody asked me what I had in the sacks and I said it was none of their business."

Now just a word in reference to the packing of peaches—those for immediate use, within twenty-four hours. In the early part of the sea-



Farm of D. H. Day, Glen Haven, Leelanau county. Mr. Day is President of the West Michigan Development Bureau.

son people use them for table. They want a small package—a take-home-with-you package that they can take home and put in the cellar for slicing and eating. So we use one that will retail for 50 or 60 cents. Later on we use a seven-eighths basket and put on a bushel by weight. We weigh them up and guarantee full weight, but it is only a seven-eighths basket. Then we use a netting over them and that holds them on. In reference to the package question, I feel that conditions vary so much we may not all be able to use the same, but it matters not whether we are harvesting and marketing our summer fruit or our peaches or pears or plums, I am satisfied it does not pay us to use an old, unsightly-looking package. Let us use a clean, neat, tight package that will bring us customers and will keep them. Now, friends, I think I have covered this ground in a scattering way, and if any of you wish to ask a question, I will be glad to answer them.

A Member: In packing peaches in the $\frac{7}{8}$ baskets do you use covers?

Mr. Farnsworth: Just netting, and tuck it along under the rim of the basket. We have a large local trade there. People for seventeen miles distant and machine after machine comes out of the city bringing people to see the orchards, taking home apples or peaches as the case may be; we generally have them setting around in packing house. It doesn't pay in dollars and cents to treat a customer so you have to get away from his neighborhood before you get a new one.

A Member: What objections have you to the sack in picking apples?

Mr. Farnsworth: The pickers in climbing about will bruise them more or less, and if they climb into the trees, which we do not allow until it is necessary as it damages a tree, with the baskets they are not going to damage them.

Mr. Smythe: What have your peaches averaged you in the last five years.

Mr. Farnsworth: I could not answer.

Mr. Smythe: The reason I asked the question is on account of your local market. Most of the fruit in Grand Rapids is sold on the open market.

Mr. Farnsworth: This year they run from \$1.75 to \$2.50; some \$3.00—these were the Kalamazoo and Elbertas. I think possibly on an average of \$2.00 or \$2.25. Some of the smaller varieties sold at \$1.75.

Mr. Case: I think that very few of us here are as nicely situated in regard to marketing the products of our fruit farms as Mr. Farnsworth. As I understand it, the trolley people let him have a car that he loads up every night and sends out. He sells practically all of his fruits by telephone. This car goes through some of the smaller villages, and they meet it and take what they want. Finally this car runs into Lima, where the balance is sold the next morning, and the car comes back, and they use this car over and over again. We are not situated like that. We have to go to New York and Philadelphia and even Springfield and Worcester, and we have to go in carloads; our fruit must be cooled and it must be under-ripe. We could not pick peaches as he does.

Mr. Fralick: I would like to know how to prepare this fruit under different conditions. In regard to help, etc.

Mr. Farnsworth: The help question is one that is troubling all of us. There are a good many other ways of handling your crops to good advantage, even if you are not situated as we are. Not all the fruit

goes under that grade. We have second grade fruit and the hucksters come out and get that, and I suppose the poor people suffer. I believe that many don't employ or use enough labor. Some of us cannot get it, and yet people are idle in the city and crying for low prices and won't come out and help us. I am not much in sympathy with such people. A year ago one of our men was sick along in June and we had to get another man—you know what a busy season that is. We put an "Ad" in the Toledo paper and there were 62 or 63 applicants, and we got a very good man from these applicants. Possibly you have some people in your city who want a place on a fruit farm to learn the business. We have many bright young men who are doing good work. The Pennsylvania College sends out young men to get the practical education required; we get them and we find they are good help.

Mr. Rogers: What method of cooling is used in the cold storage?

Mr. Farnsworth: I have no cold storage at home. My brother has. He uses ice overhead—direct icing above. My own plan of handling my apples especially has been—we have a large cellar and a packing and storage room above for packing the apples in and an elevator carrying the fruit above from the cellars below. We pack directly into the barrels if it is cool, but much of the time it is not cool enough. Then we let them stand on the barn floor, which is cool, and the following morning while it is a little damp for picking and apples are cooled off we can use all hands to put them into the barrels. We just simply put them into storage for packing in the winter. Some prefer to grade them in the orchard and pack them right there.

A Member: In packing by weight, isn't it quite a job—isn't there quite a difference in the weight of the peaches?

Mr. Farnsworth: Yes, you take some of the smaller peaches and there is a vast difference. Of course for the apples we use a full bushel. But we have scales setting where they are handy, and we set them right on there and put them in. We grade all our fruit by hand, and that requires considerable skill and experience, but if a picker has graded for a year or two he will get pretty close to how many apples are necessary for a bushel. If you have to load into a car you could not pack them that way.

Mr. Fralick: The weight proposition is one we are coming to if we can get a bushel of peaches into a basket by weight.

Mr. Farnsworth: I doubt if you could get a flat cover on a bushel basket and get the weight in.

A Member: I have been loading in bushel baskets and we just load them without anything over them.

Mr. Farnsworth: You are at a disadvantage there. You set your basket which is only about level full by the side of one that is rounded up and you know the one a customer would take.

Mr. Pratt: You spoke of the Western boxes containing so many apples. That is the only true pack. With us, we have too many various sized apples in the package. My experience has been that this is a hard proposition—to get a grade that is of a size. What is your opinion of automatic graders? Do you think it advisable to use them. They don't grade them, but put them in sizes.

Mr. Farnsworth: It grades them for size; not for color or perfection. I believe under a good many conditions that plan can be used to good advantage. I would certainly try it, but as I said, our conditions are

different; we get them a little more mature; they are ready to go on the table and eat. It is a little more work to grade by hand, but I believe it pays us in dollars and cents if we can get the help.

Mr. Sherwood: Last year the barrel outsold the boxes by from two or three to one, and I think it will do it again. The point I want to make is this—that the barrel is the Eastern package for the Eastern apple grower. It is the most economical as it is not necessary for us to pack every apple the same size as in a box. If you pack No. 1 it can vary in size and still be No. 1. I understand the Western growers lose many of their apples by this, and it seems to me for the general market it is a very foolish thing to try boxes.

Mr. Farnsworth: I think you are right in a certain sense. I believe even in our barrel stuff if we would grade them down so closely that they would not vary to exceed $\frac{1}{8}$ inch in size and diameter we would get a better price for them. Uniformity appeals to the eye. If you get them uniform in size I believe you will win out even in barrels. But it is my opinion we will get enough more for the box because it is smaller. You set a barrel of apples into a city consumer's cellar and there is no room it is so small, and many of the cellars are heated and the apple is not very good in quality after it has been in a warm cellar for a week, and they lose their taste for apples. But if they can get a fresh box of Ohio or Michigan or New York apples put up just the same, and let them know which were Western and which were Eastern, if we will pack them accordingly, we would get the sales.

A Member: They are selling better in the barrels.

Mr. Farnsworth: You take a box of apples and a barrel that are guaranteed, and the same number of bushels of bulk stuff and what is the difference in price? There is sometimes three or four times the difference in price. Now I believe we should not pack apples that cannot be put on the table or eaten with the lights turned off.

Mr. White: Regarding Western apples, a man would have to be a packing expert to know how many there are in a box, because there are all the way from eighteen sizes up. Anyway, most of the Associations in the west will pack eighteen sizes in boxes according to the varieties. As to the advantage of the box over the barrel, I just want to speak a few words for the Fruit Growers Association in Northport. This season everything that went out of the Association at Northport was labeled, and we got a price of \$2.65 for all standard apples except Wealthys, and the Association charged 3 cents per barrel for handling. Now I don't know whether that is considered a very good price or not, but believe we could have done a little better if we had not been in such a hurry. But taking it all through, we felt pretty well satisfied with \$2.65. In regard to the mechanical grader, I wish to say that Mr. ——— of Empire has used one and has been getting remarkably good prices.

Mr. Roach: In regard to graders, we have been using one with good success. We just simply stamp the number in the box on each one. The grader made five or six different grades, but we had stamps so we simply stamped the number in each box. When a man come to buy, he knew how many there were in a box—like oranges. All you have to do is keep track of the tiers when you put them in.

Mr. Farnsworth: Did it bruise the apples?

Mr. Roach: Not a particle.

(A member speaks of a grader that was bought on trial and kept. It reduced the expense of packing.) Called the Schellenger.

Mr. Farnsworth: Describe it please.

Member: It runs on an endless chain connected up with a cog wheel on each end, which goes around carrying the pockets which gauge the size of the apples, and of course as this belt goes around they drop onto the table. It is fed from one end, the apples going through grooves at the end of which are little fingers. It trips fifty times a minute, and every time it trips, it trips four apples. It will sort on an average of 300 bushels per day—all ordinary apples. Of course if they are wind falls and have not been graded it takes longer. A hand picked apple is easier, and the man at the hopper can easily grade them. We use an engine to run it.

Mr. Case: We had to go up to Ohio to find a grader. We finally bought what is known as the Burke, and we have used it very successfully on peaches and pears, but not much on apples because we are organized the other way, but see no reason why it should not work on apples as well. We had no trouble to run one hundred bushels of Bartletts through in an hour. It cost \$60. They have a treadle and a hopper that comes with the machine but we did not buy it. We put on an automatic feed with which we could turn the peaches or pears on the belt so they would not bruise.

A Member: How do you size in grading?

Mr. Case: Just as you want them.

A Member: How big?

Mr. Case: Just as you want them. It is adjusted on each end. We run through Seckel pears and made them in three grades; our Bartletts we made into only two grades, No. 2 or culls and No. 1. One year after we got through packing we rented our packing house to a man who was not through, and he run a lot of apples through it. You can run Kings or any of these big varieties. We were very much pleased with it.

A Member: How many per day?

Mr. Case: One hundred bushels per hour of Bartletts, and on peaches in an hour and fifty minutes, with thirteen women and four or five men to wait on them, we run through 300 bushels.

Mr. Munson: What power?

Mr. Case: We have electricity. I think that the motor we have on that is about $\frac{1}{6}$ horse power; it might be $\frac{1}{4}$.

CO-OPERATIVE MARKETING.

R. E. HANLEY, CHICAGO, ILL.

Preliminary to my brief observations on co-operative marketing I venture a few remarks on the apparent great need of greater organization among Michigan Horticulturists in the matter of marketing.

I will hazard the assertion that the State of Michigan is less organized in that respect than any other state in the Union equally as important in the production of fruits.

There are among you, of course, men who have by more than ordinary efforts produced fine fruit, packed well and consequently have established a trade demand for their goods.

But just as sure as the sun shines these men are going to have greater competition among their neighbors in the production of fine fruit, thanks to the efforts of the Michigan State Horticultural Society and your college at Lansing.

In consequence you are sooner or later to be brought face to face with the absolute necessity for co-operation among you to prevent destruction of your industry by wasteful competition at home.

Through rapidly increasing bearing acreages you are threatened with the possibility of overproduction, alarm about which has already had expression during this convention.

With ninety millions of consumers we are not likely to reach a state of overproduction of food products for some time to come, provided these supplies are equitably distributed and proper distribution of large volumes of fruit can be arrived at only through co-operative effort.

We heard about 12 years ago expressions of grave fear on the part of Pacific Coast fruit growers relative to rapid yearly increase in the production of citrus fruits, California at that time shipping to markets 18,000 cars of oranges and lemons per year.

The industry steadily expanded to a present normal output of 40,000 carloads annually, brought in direct competition too with six million boxes or twenty thousand cars of the same fruit from Florida.

From this will be seen the extent of the advance of one branch of horticulture and the growers by reason of standardization of pack and proper organization are still making money.

With this fruit competitive with your own together with peach and apple districts throughout the country vying with one another to raise and ship better fruit, are you in Michigan not at considerable disadvantage without greater marketing organization among you?

I believe Mr. Mumford's able suggestions this morning fit in here and every fruit grower of this convention should take home the duty of organizing his local county thoroughly.

It may seem presumptuous for me, an outsider, to attempt to advocate what may seem to be a need in your midst, but I do it earnestly with the best intentions.

I may modestly make claim to having had association with horticultural interests from three different angles: First through employment with the Armour Car Lines of Chicago engaged in the distribution

of their large rolling equipment specially adapted for transportation of perishable food commodities.

The Car Line furnishes in season refrigerator cars and the necessary ice for the movement of fruit in practically every large producing territory of the country, including your own state.

I am reminded of that period when the Car Line by reason of its tariff charges was not so popular among you shippers.

Secondly, in 1909 I was chosen the first Business Manager of the National League of Commission Merchants of the United States, an organization which has for its purposes the promotion of the commission business and greater co-operation with the shippers.

In my present affiliation with the North American Fruit Exchange I am brought closer in touch with the growers' problem than ever before.

Few, if any, are there to dispute the success generally of co-operative marketing by growers of fruits and vegetables. Through that method which has importantly developed within late years the growers have benefited through economic advantages and have secured greater returns for their products by reason of concerted shipping and marketing.

From the old plan of the growers undertaking their own marketing, each for themselves according to individual ideas or preferences as to methods, quite without regard for competitive neighbors, with consequent irregularity of shipments and attendant market gluts, co-operative marketing was a long step in the right direction. However, the institution of the growers co-operative organization in many cases has not solved completely or satisfactorily the problem of acquiring for the producer returns for his produce commensurate with the time, energy and expenditures involved, nor with ultimate costs to consumers.

To this fact must be charged, to some extent at least, the widely varying methods of marketing pursued by associations and exchanges of the growers now operating throughout the country. A pronounced lack of uniformity in methods of operation and systems of selling is revealed by a brief study of some of these organizations.

The student of co-operative marketing turns readily to California where exists the commonly accepted ideal growers' marketing organization, the California Fruit Growers' Exchange.

The Exchange is a co-operative body of approximately 6,000 fruit growers distributed among about 100 local associations within the state. Through its strength of number and consequent tonnage shipped over a period of ten months in a year, this federation of growers is enabled to, and does maintain continuously throughout the year, an elaborate system of sales offices of its own in the principal marketing centers. This established selling force largely facilitates equitable distribution among the markets and excepting a small percentage handled through auctions in few of the largest cities the Exchange's fruit is disposed of by outright sale in carlots to local wholesalers, prices being governed practically by supply and demand.

The success of this organization can be somewhat attributed to the binding contract existing between the association and its members, there being little opportunity for degression on the part of the growers, a harmful practice so common to members of co-operative bodies in other states.

While the Exchange is said to be somewhat top-heavy with numerous high-salaried officers, and outlays of large expenditures for packing

plants, box factories, sawmills, and other auxiliaries are alleged to be burdensome to the individual member, this organization controls practically 60% of California's citrus crop which is normally placed at about 40,000 cars per annum.

In Florida we find a citrus fruit growers' organization following much after the California plan, but with less than 20% of the state's crop under control. There being only a limited tonnage available and moving during a period not to exceed six months of a year, the Florida Exchange is only warranted in operating but a few sales offices of its own, using principally for an outlet for its fruit the auctions of a few of the larger markets generally oversupplied.

We turn now to the Missouri-Arkansas Fruit Belt where organization among the growers has had thorough promotion—where a federation of local fruit growers' associations was undertaken the past season or two with some considerable degree of success. A central association that had been formed of local associations as units, by judicious advertising endeavored last season to attract desirable buyers to points of shipment, and for the sale of the major part of its shipments consisting mostly of peaches depended upon its personal sales representatives specially employed and assigned to many of the northern markets.

The principle of operation seemed feasible and commendable since the association retained entire control of its products until paid for by the carlot purchasers, but since the services of the market salesmen or representatives were required only about 45 to 60 days the association was dependent upon local talent it could procure among the farming communities, rather than competent and experienced salesmen obviously not available for short time employment. It can be easily understood, therefore, at what disadvantages the association operated with men not thoroughly experienced in the selling end of the fruit business—in fact, in some instances without any acquaintance of the trade or knowledge of local conditions in the markets to which they were assigned.

We may look to Louisiana for light on the system of cash selling as disclosed through the operation of several strawberry associations in that locality. By reason of that section's early production of the popular berry each season generally opens with a liberal attendance of representative and transient buyers to whom cash sales of berries are made. Working under these conditions in the past the prices have been governed largely by competition among the attending buyers and often without sufficient regard for market values prevailing at the points of consumption.

For information regarding distant market conditions these berry grower's associations in most part have been dependent upon dealers or commission merchants directly, or indirectly interested in prospective purchases or consignments of surplus cars, a source not considered the best guidance in determining proper values at shipping points.

Cash sales under these conditions being somewhat subject to unfair combination among the buyers and speculators, cannot be depended upon always to secure for the growers full value for their products.

In Texas there has been in existence for several years past an association with a membership comprising 1100 truck growers and which has shipped annually about 3,000 carloads of vegetables. At the present time we find the membership of this association in general uprising in

protest of the association's selling methods and the organization appears to be on the very verge of dissolution in consequence.

In the past this association has employed at good salaries a manager and assistants, who undertook distribution of the association's shipments among commission merchants throughout the country. This plan appears to have proven very unsatisfactory to the growers who are now demanding outright sale rather than the consignment of their products.

It will not be difficult to understand from these examples cited—and we could give many more were there the time—how diversified are the marketing methods prevalent among present day co-operative organizations of growers. One may be easily impressed, therefore, with the great need of some uniformity in selling methods among these growers' associations themselves and that necessarily this must come through more far-reaching co-operation among the producers of foodstuffs.

The growers' association that serves best its membership is that one which can:

1. Procure for its members the best of supplies and implements at minimum of cost.
2. Provide suitable facilities for the careful grading and packing of goods for market.
3. Regulate harvesting as near as possible to market requirements.
4. Establish such a reputation for quality of goods and packing and for reliable dealing as to create cash demand for the association's products.
5. Equip itself with experienced and dependable sales forces in the markets of the country through which can be executed outright sale of the association's products before, at, or after time of shipment.

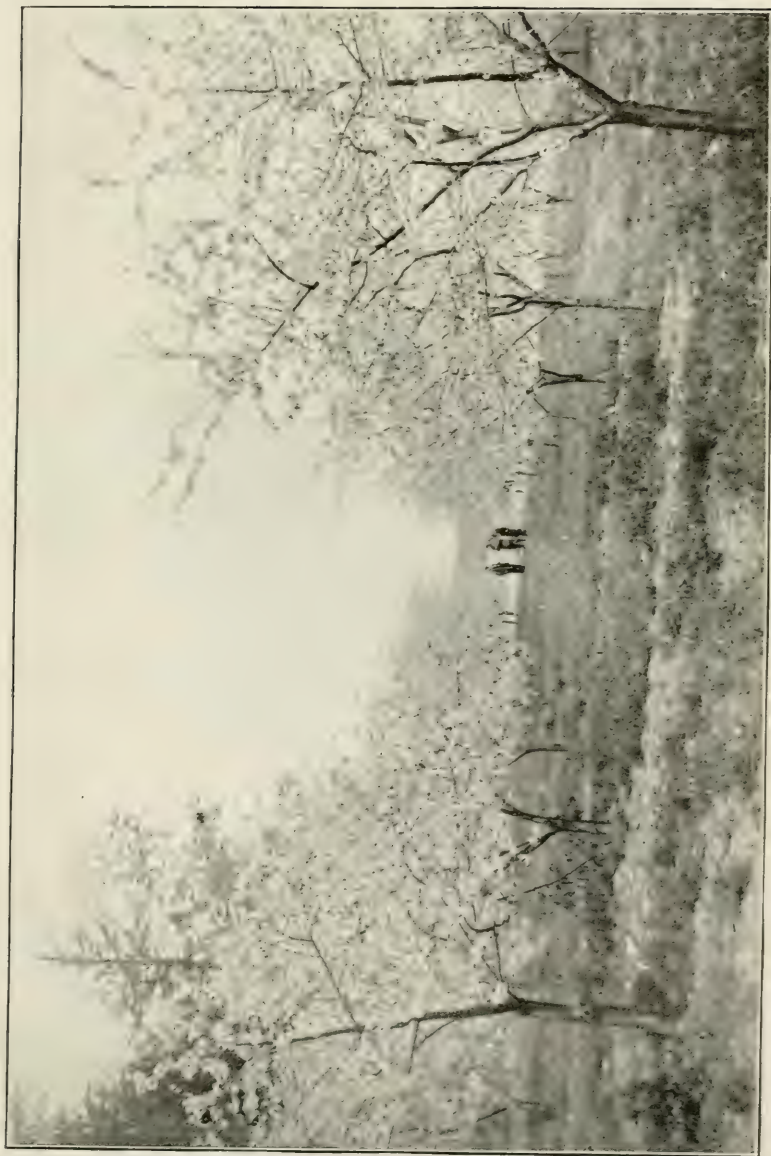
The accomplishment of most of these requirements may be arrived at through competent management, but it must be plain that an establishment by the individual association of an extensive sales force after the pattern of the California plan, which is that of large commercial enterprises generally, is not feasible except with the control of sufficient tonnage distributed over an extended period warranting the expense.

In fact, no single organization of fruit and vegetable growers outside of California appears to have that volume of output requisite to the maintenance of a complete marketing machine of its own.

Recognizing these shortcomings and needs of the individual growers' organization measures were undertaken in 1910 to create a central selling agency with a corps of trained salesmen located in the important market centers that might be utilized jointly by non-competitive associations or exchanges shipping in consecutive seasons throughout the year. The centralization of selling effort by important shipping factors variously located from Florida to Oregon was to make possible the year round operation of an organized selling force, but under expense to the individual association only as actually needed.

Under this plan it was contemplated the sales force at the marketing end would operate under direction of the individual association's manager in season in the execution of sales orders and in acquiring authentic information of markets to facilitate distribution and selling at points of production.

It was thus the North American Fruit Exchange, referred to as an exchange of exchanges, came into existence, promoted primarily by horticulture interests of Florida, West Virginia, New York and Oregon.



Orchard of L. F. Titus, on Grand Traverse peninsula.

The Exchange operates district sales offices in practically all of the important marketing centers and from its general offices at New York and Chicago constantly supervises the activities of this extensive force which, however, looks directly to the shipping associations for instructions, presently these facilities are utilized in season by the following shipping organizations, the list to be augmented shortly by other desirable affiliations:

Northwestern Fruit Exchange, Portland, Ore.
 Monmouth County Farmers' Exchange, Freehold, N. J.
 Peninsula Produce Exchange, Pocomoke, Md.
 Eastern Fruit & Produce Exchange, Rochester, N. Y.
 Virginia's Fruit Exchange, Charlestown, W. Va.
 St. Joseph-Michigan Fruit Exchange, St. Joseph, Michigan.
 Georgia Fruit Exchange, Atlanta, Ga.
 Indian River & Lakeworth Orange Growers' Assn., Cocoa, Fla.
 Western Slope Fruit Growers' Association, Palisade, Colo.
 Arizona Orange Association, Phoenix, Ariz.
 Stevensville Grape Assn., Stevensville, Michigan.
 Nauvoo Fruit Growers' Union, Nauvoo, Ill.
 West Coast Fruit Association, Clearwater, Fla.
 Garfield Peach Association, Garfield, Ark.
 Independence Farmer's Association, Independence, La.

Concluding we add that when we have before us, as now, popular clamor anent the high cost of living, greater expansion of co-operative selling, supplemented when possible by consumers' co operative purchasing, seems to be surely the order of the day.

Necessity requires continuance of effort in that direction to the end that the producer may acquire greater returns and yet the cost may be less to the consumer, for essential food products of the farm and orchard.

“GETTING THE DOLLARS FOR OUR FRUIT CROP.”

W. G. FARNSWORTH, WATERVILLE, OHIO.

I believe the subjects to be discussed this afternoon are some of the most important that we have to deal with as fruit growers or farmers. We have discussed during the meeting here nearly all phases of the fruit growing problem and we have struck this question several times. Coming to you as I do from very different conditions and environments in the adjoining sister state of Ohio, what I may have to say may not fit your conditions. In fact, I am fearful they may not. However, I may drop a few thoughts that may be taken home and worked over to suit your conditions. We realize when we come to start the marketing of our product the problems that we have before us, and Prof. Eustace's remarks yesterday morning, coming at the opportune time, before your crops are ready to be harvested in such enormous quantities as are shown by statistics today will serve as a warning of the labor required in harvesting and marketing and I believe you people realize the problem that confronts you in that feature of your cherry crop especially. Now in a pleasant drive we had this morning over a portion of the country,

we noticed quite a number of orchards. We noticed also the condition of the roads, possibly because they are so different from what they are at our own home. We would feel that we were confronting a rather serious problem were we to draw our fruit even two or three miles over some of the hills we passed this morning. I might state our conditions briefly so you will realize the conditions. Our packing houses—one of them is within a half mile of the station and an electric line. Our road is a stone pike and one horse will draw two tons. The other packing house on my place where we live is not quite a half mile from the stations, so you see that one horse would load a car very easily with a one-horse wagon in a day's time, and you see why the transportation facilities required are very limited. I feel that one thing your section here needs is good roads with lighter grades, so that you can bring your fruit to market at a much less expense, because if we are going to get the largest result out of our fruit in dollars and keep them, we have to eliminate some of the expense of handling that product. So I would suggest first an improvement in your roads. As I said to a young man who came to our place a few years ago to get some practical experience—(he had capital back of him to buy a farm), as he was going into the fruit business. He asked me many, many questions and one of them was "What is location worth?" and I told him that would vary, but I considered it would be worth \$200 per acre for bare land for location alone. He thought at first that was a rather exaggerated statement, but before he left us in the fall he realized that it was the truth. There is another suggestion that has been offered here a number of times. I know the failing in human nature, in Ohio as well as in all parts of the world, every fellow is afraid of the other. One fellow will swear that I am a rascal and I will swear that he is a rascal; in fact, we are very jealous and hard-hearted—we put our heels together and kick each other. It does seem we cannot get together and organize, and that one point in the marketing question is where our Western brothers have us down. They are organized for the simple reason that they are obliged to organize or starve to death. Here you are making a good living—(as your presence here would indicate)—but I am perfectly satisfied in my own mind that by thorough organization you will help yourself and the state at large very materially. And right along this line I might mention a suggestion that I believe is to be put into operation in our own state. A week ago this last Tuesday there was a meeting of the executive committee of our State Horticultural Society with our Agricultural Commission to see if they would assist the state, or the people at large, in the marketing question. This plan was suggested. Realizing that our people in Ohio were of this independent disposition, and I believe the farm suggests independence, the Agricultural commission is to fix a standard package. It is somewhat like the Sulzer bill, but the package was to be a box or basket or barrel containing a certain number of cubic inches. Then fix a standard for grading, and after the standard has been fixed put this matter in the hands of the inspector and his deputies, in combination with our pure food commission. They were to use stamps. We have somewhat combined a number of plans, but believe the stamp plan could be used to advantage. This is to be carried out through the Agricultural Bureau. We have them fix the standard package and a standard grade; then put the inspecting powers in the hands of the Bureau and Food Commission. As the inspector

goes around through the orchards he can also look after the fruit, and can instruct the different parties that buy the stamps how to grade the fruit so it will be in compliance with the standard fixed by the Commission. This stamp is to carry the guarantee of the Agricultural Commission of the state and the number of the persons purchasing it. The Bureau and food inspectors are authorized to inspect or seize any package bearing this stamp in any market or any warehouse or in any consumer's hands, and after inspecting, if it does not conform to the proper regulations, the stamps can be revoked and penalty collected. Now we believe this will have a tendency to help establish more uniform grading. You are not obliged to do it unless you want to, but the party who purchases say one hundred or a thousand stamps pays for that assistance the amount of purchase; five thousand stamps pays that much extra and is five times the benefit. It is self supporting, and the commission can take it up without an act of the legislature. If a dealer wants to purchase several cars of apples, he can go to this commission and find out who has purchased several thousand stamps. Then he can write and contract on the condition that the apples are packed and graded according to the standard set by the commission. As I said in the beginning, this is simply a proposition—it is not carried out as yet and there are always differences between theories and practices. After we have looked up our markets, and I believe we can do a great deal in this in keeping in touch with more than one market, it is our practice to have more than one wholesale market—a number of cities in which we deal directly with the consumer or dealer. We have heard a great deal said of the over-production of especially the apple and peach. I hardly look at it in that light. I would rather say under-consumption, for there are thousands and millions of people in our larger cities who don't know what an apple taste's like from one week's end to the other, much less than having them served on the table. It is not that they don't care for them, but we have lacked in boosting the apple. We see oranges in fruit stores and Western fruits fixed up in good shape to attract the eye of the boys and girls and the consumer, but if you ask for an apple they will take you to the back end of the store and show you some bruised and damaged ones that are of poor quality and appearance and if you ask them why they don't keep some good apples they say "if we get some good ones we cannot sell these." We have not advertised our product as we should. A little quotation from Prof. Green:

"He who whispers down a well need not expect a reward in dollars, like he who sits in trees and hollers."

Our Western friends have been doing a great deal of halloaing. One commission man told me that sixty per cent of the apples in his cold storage were Western fruit. If we can organize and get our heads together for effective work we can advertise by the same method, or similar to what they are doing in the West, and I am very glad to hear that you are doing something of this kind in this vicinity. If you are located in an isolated section you can do personal advertising. I have here several little slips. One was from your own state. It says, "C. S. Kendrick, grower of apples with flavor, Blissfield, Michigan." It is one of our means of advertising. I have here another slip from a man you all know and love—"J. H. Hale," whose business is a guarantee of the wisdom of that little slip. He sends this out on every basket of peaches.

He puts his name on his Baldwin apples; he is not afraid. "No. 1 Peaches, Case & Co., Sodus, N. Y." Not afraid to put the name and address on the package, because he knows they are packed according to the Golden Rule. You can lay aside every other phase of the question except the dollars and cents and the Golden Rule will pay you to go by in marketing your product every time. So I say, let us do some advertising along this line. Here is another slip "At the Sign of the Apple," a store handling apples especially. Then after he has advertised it, selling only a product that he can get back of with a guarantee. He has to compete with the Western people and can get their prices. It is just as well packed and just as good in appearance. I believe candidly, from the bottom of my heart, this question is the heart and center of the marketing. Growing a product we are proud to market, and then putting it up so we are not ashamed of any of the specimens in the barrels. Don't put your name only on the top of the package—put it right down in the center of the barrel, and it will have a tendency to crowd out some of the inferior stuff in the barrel. Your name won't look good along side of a gnarly, inferior apple.

I want to say something more about the package we use in the market. In the marketing of our peaches—we generally begin with them—the electric railroad furnishes us a car for the season. We go into that car and shelve it so we can place in there a $\frac{7}{8}$ bushel basket without interfering with the shelf above. This car is drawn to Lima each evening except Saturday and Sunday and brought back the next morning unloaded, so we have it each day to send out a carload of fruit. Now we use, as I said before, the $\frac{7}{8}$ bushel baskets, and put a bushel of peaches into it, and it rounds up the basket. They are covered over with netting so they will not rattle off, and the dealers take them right from the car. For two years we sent a man with the car. There are a few towns between our town and Lima where there are dealers, and this man worked up the trade. One gentleman asked him if he did not have to turn his back when he made the prices, but we got them, and the consumers were satisfied. Now the dealers come to the car and get their orders, and if there are any left a wholesale man in Lima takes care of that trade. He comes to the car and cleans up everything that is left in the car in the morning, and the car comes back. In this way we can let our fruit get a little riper, and so a little better quality, and it is not bumped around by the railroad men. By setting them carefully on these shelves they get in in almost perfect condition, and we get 90 per cent of the consumer's dollar. In the handling of one apple crop we do not use these $\frac{7}{8}$ bushel baskets to any great extent. We use a twenty pound basket in which we pack our select or choice fruit. Sometimes we use the bushel box or full bushel basket or barrel, especially for the second grade, but for our local trade the twenty-pound basket is used almost entirely because the fruit is all exposed and covered with a net. You will be surprised how many dealers and persons from adjoining states have written for our fruit, and we find out by this means that we can get just as good prices as they are getting for the box apples, without the extra expense for the box and packing. For your immediate section I want to reiterate what I said yesterday. I feel that when we come to the packing of our choice fruit in the boxes then we can get the trade that the Western growers get now. For the better fruit, it is my candid opinion, you will want to put them in bushel boxes for

the long shipment you have here. Now I don't know that I wish to take up more time this afternoon. If I have not made my point entirely clear I will be pleased to do so.

(Mr. Gray asks a question in regard to selling peaches at auction.)

Mr. Farnsworth: The gentleman brings up another method of marketing which is found in the peach belt of Northern Ohio, and it may come into practice here. It is selling them at auction. They pick the fruit, run it through graders, pack it carefully and bring it in wagon loads to the auction block. It is sold very rapidly, and I want to say they are getting remarkable prices for it. The dealers from New York and Boston come there and bring their money with them and deposit it in the bank. They are not taking any chances with the commission men, and as they buy a load of peaches the man is given a check and he goes right over to the bank and gets his money. Where there are larger quantities, and the section becomes noted for any one kind of fruit, this is perhaps the best way to market. I believe you can get this method by organization.

I would like to leave this thought with you in summing it up. If I were an independent grower, situated where I could not organize and help the other fellow, I would grow the very best article possible—try to excel if possible; I would get a little neater package than the other fellow if I had to spend more money; then I would put it up better than the other fellow and get the most money out of the purchaser. If I were situated where I could organize I would be one of the first to say “come on boys, let us get together in an organization and see if we can defend ourselves and get the rightful share of the consumers' dollar.” I want to thank you for the courtesy you have shown me in the last few days. I am satisfied I have received more than I have given, and I would like to see you at my home. I have been in Brother Case's orchard and can vouch for everything he says, and would go a little further if he were not such a modest man. If you get near Toledo I would like to have you all come and visit me, but would make one request—that you do not all come at once.

MARKETING PROBLEMS.

MR. B. J. CASE, SODUS, N. Y.

There are some points that I think you can well take home with you. In the marketing problem of our fruits, I claim that when we have our fruit grown, packed and delivered on board cars there is only one-half of our problem solved if we are going to market fruit successfully. Another thing, I claim that there is no market equal to a home market until that market is supplied. There are hundreds, I may say thousands, of small towns and villages all over this land that are not half supplied with fruit, and there are people right near them that can grow the fruit, and can deliver it to them if they will turn their attention to it. I am going to risk the statement that there is hardly a fruit grower in this audience but what lives in or near a town that is not using nearly the fruit it would use if you would deliver that fruit to it in good condition at a reasonable price. Now we hear a great deal about how much

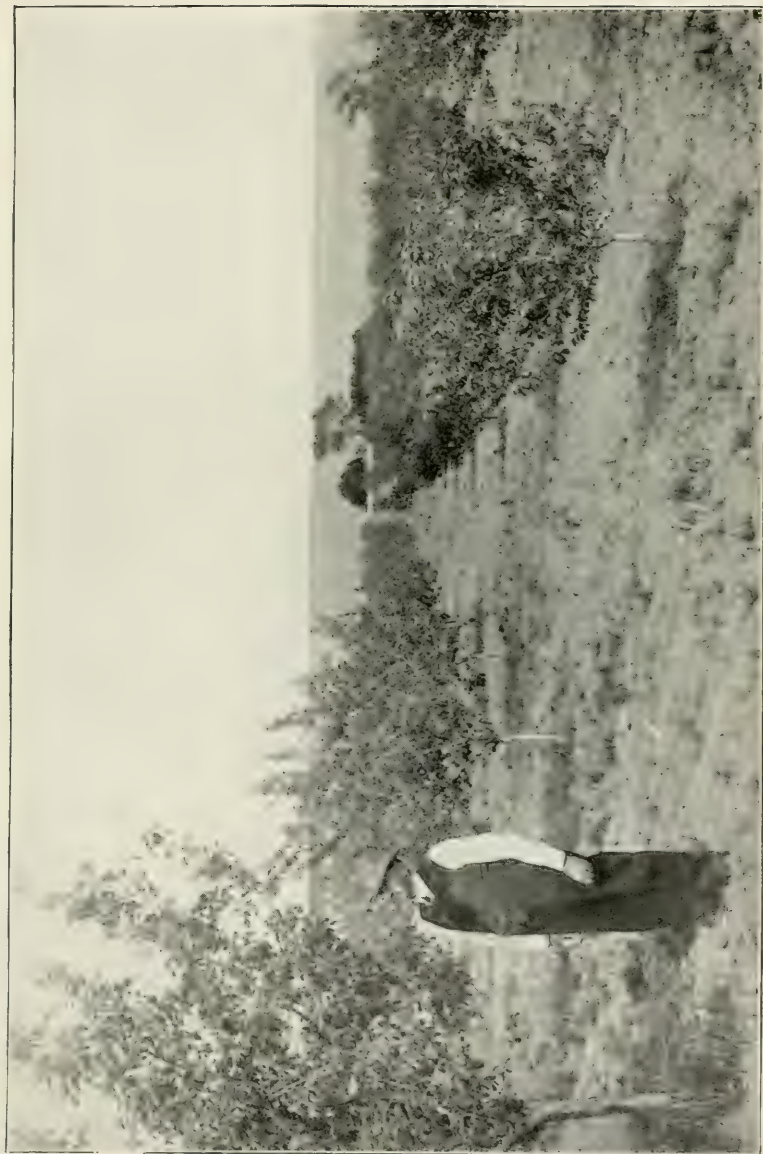
it costs to market this fruit. I took these figures I am giving you here from memory. I find that when I come to the final result I think I am about four dollars off. Last fall I had 160 barrels of Kieffer pears. At the time I picked them they were very dull and it was almost impossible to sell them; I don't think I could have gotten over thirty cents a bushel for them in our section. I thought that was pretty cheap and I took my chances. I barreled them up and sent them to Rochester. They laid there until along in November, and I saw the pear market in New York was improving and notified our commission man that we used there that I had a car of pears and any time he thought the market was in good condition for it to wire me and I would order them out. In a short time he did so, and the car went to New York. Now that car was packed in two grades, and sold on the Barclay Street dock for \$450. Now I wanted to know just how much more money I got out of those Kieffer pears than I would have had if I sold them in the fall. The freight was \$43.20 from Brighton cold storage to New York—fifteen cents per cwt. The commission was \$45—ten per cent. I am taking this from memory and it may have been seven per cent. All barrels had to be opened, and a cushion was put on them. It cost \$16.00 to prepare these barrels, or about 10 cents per barrel including broken hoops. The cold storage charge was 25 cents per barrel or \$40.00. Freight from Sodus to Brighton is seven cents per cwt. and cost about twenty dollars. None of these charges are high. Case & Company do the marketing and they have ten per cent of the products of my farm, which is credited to Case & Co. The barrels cost \$56.00. Now if I have carried these figures through right, the car of Kieffer pears that sold for \$450 in New York by the time it got back to me got down to \$220, and none of the charges were exorbitant. I made \$75 or \$80 by holding.

If I can offer any suggestions that will help you in marketing, I am glad to do so. I can give you my plan. I am on the south shore of Lake Ontario, in a little town of fifteen hundred in a large fruit section. I conceived the idea of getting just as close to the consumer as I could many years ago. We have five or six counties north of us that don't grow much fruit—a few strawberries and a few red raspberries; a few apples of the early varieties. I make a trip up there and call on the grocery men who are handling the fruit and take their orders. I commenced that in 1886. I give them a quotation, after I get going, every Friday; I put on a postal card the quotations for the next week, keeping them thoroughly posted in regard to the fruit coming on the next week. They get these quotations Saturday morning, and before the time of shipment Monday we most always have plenty of daily orders. We carried that on until about five years ago, when the American Express Co. would not give us service. I found it almost impossible to deliver a crate of red raspberries or a crate of peaches into the northern part of the state in salable condition, so the groceryman could sell that fruit without a loss. We came, after working up that trade all those years, very nearly throwing the whole thing up and going to the big cities. Then we found in Watertown a couple of young fellows had started a fruit commission business and were supplying that country. I knew one of them, and the other one was from Elmira. We turned this business over to these young fellows with the reputation we had been years in getting. Then we commenced shipping by freight in carload lots. There was a through freight train going through, that is not sup-

posed to stop at Sodus. We arranged with the railroad to have our car taken out, and got the railroad officials to give us power to hold that train there certain times to 5:30, and on certain special occasions we can hold that train until six o'clock, but it is given us to understand the limit ordinarily is 5:30. Our car is put on that train and taken through to Watertown. We have electricity in our packing house, and we cool the cars with electric fans. We open both ventilators and start a fan going, and always leave that fan in the car while the fruit is loading. Now that car is in Watertown at four o'clock the next morning. Immediately upon the car leaving our station, when we know what is in it, we call these men on the telephone and tell them what is in the car so that they know before the car arrives just what is in it. They sell it in Watertown, or they are in time to get out by express from Watertown to the smaller towns. That is the plan that we have handled a large part of that trade with, and we have had to fight for it. This market is right near us and we propose to hold it. I don't like to be too personal about this, but I take pride in telling you a few things I picked up. The same Presbyterian minister who told the story of the foxes' tails is around our warehouse more or less. He has a sister living at Mannsville, near Watertown, and during the peach season he goes down to visit his sister at Mannsville and once he was in Watertown visiting and saw in front of the fruit store a whole sidewalk full of peaches, with many of our peaches among them with our label on them. Knowing us, he is interested. There is a man there buying peaches, and the dealer asks him \$1.15 per basket for our No. 1 peaches. There is another basket of peaches there that looks just as good as ours; he asks 90 cents for it, but the man buys our peaches. The minister thought that was funny as the other basket of peaches looked just as good as ours, and he says to the buyer, "I am interested in your buying those peaches. I am wondering why you bought that basket at \$1.15 when you could buy these for 90 cents." The man says "That basket is Case & Company's peaches; they are all alike through the basket. I have bought them for years." When that came back to me, showing that the people were appreciating honest packing it was a great satisfaction to one. Moody & Stewart asked us to give them the control of our peaches in Northern New York and said, "We can get you 25 cents more per crate for anything you can put in here." Now we are up against the point where the fruit has increased so that this section cannot handle all our fruit. Understand, we dictate the price that Moody & Stewart gets for our fruit, we dictate the price, and if we cannot get it they can't have the stuff. We expect to be reasonable and fair and every time give the man his money's worth. We pack our peaches in three grades; that will take care of anything that is marketable. We will not allow any stuffing of baskets. It is an old saying in our packing house about Case & Co.'s reputation. I go in there and say "Girls, our reputation is in your hands. Don't you put anything in those baskets that you would not like someone else to put in for you if you had to buy them, and don't you let me catch you stuffing these baskets or putting better fruit on top than you put right down through them." That is the way we have built our reputation, but now we are up against the bigger markets in New York. We have tried for two or three years to get in New York right, but have failed. We cannot get in there with the price we should get for the quality we have grown. At last I think we have found a way to get better results. I think it was

in 1909 or 1910 we had a beautiful crop of Greenings on our Bay View farm. G. W. Olivet of Olivet Bros. was up there and I told him I had a scheme in my head of packing these apples in two grades; three inches and two and one-half to three, and he says, "Let me have the apples." So I packed up about a car of them that year and shipped them to him, instructing him to use his judgment whether to sell or store. He sold them. He sold the best apples for \$4.50 I think, and the other grade for \$3.50, but there were more of the lower grade than the upper grade so we did not get as much money as we would have had by the barrel if they had all been packed together as No. 1 Greenings were then drawing \$4.00 per bbl. I never knew until last fall who had those apples, but the very next year the party who had them, hung around my orchard for a week and tried to buy my crop of apples. He was not a very prepossessing fellow, but I looked up his records and saw he had the money—the commercial agencies rated him at 100 to 125 thousand dollars. But I would not sell my apples to him, and I afterwards found that he had bought my apples the year before and got \$7.00 a barrel for them. The point I want to make is this. If he had come out straight and told me he had bought these apples for \$3.50 to \$4.50 and sold them for \$7.00, and told me he was in position to handle my apples and sell them for a good price, he would have got them. That is the firm we are now hooked up with, and we are shipping them right along.

This idea of the value of associated effort it seems to me is the thing that the fruit grower must wake up to. We must follow the golden rule, not from any religious standpoint but as a business proposition you understand, my religion is, and I don't want one that I can't mix with my business, and I claim that a religion is no good that doesn't help a man get a living, and help him do it in a legitimate way. There, I claim, is the point in marketing. Don't try to do customers up; be sure that you are giving them their money's worth. I think the fruit growers will wake up to the fact that from the time we set the trees until the time we deliver the fruit the interest of the consumer must be considered—that the fruit growers know a good deal better than the consumer knows what will please him. You know that is a fact; we are making a life study of it. Keep the consumers' needs in your mind all the while, and then another thing, I believe we want to get just as close to the consumer as possible, but we want everybody that touches our fruit or has anything to do with it to make a small profit. We don't want them to get rich off us, but from the time it leaves our hands until it goes to the consumer we want everyone to make a living profit and the consumer to be satisfied. If you get the people who are not near big markets that will handle their fruits together where there is a bunch of them co-operation can be made a success as in Sodus, and I have a scheme in my head that I think will work out. It is something on Mr. Morrill's plan—perhaps a little different. I have thought a little of trying out my plan, but fail to see where it will be of advantage to us because we can market our own fruits. But this is the plan. Form an association called a marketing association. Every person who joins that association is a stockholder, and to become a stockholder he has to take, say ten dollars worth of stock for every acre of fruit he has in bearing. When you have the stockholders they meet together and appoint a Board of Directors and they appoint a manager. When the manager is appointed you have to have a man that has executive



Duchess Apples with Cherry fillers on fruit farm of A. A. Lasch at Lee's Point, Leelanau county.

ability enough to hold the whole list of stockholders loyal to him. You look over the associations in the country, and all that have been successful have had one or two such men. You take that Potato Growers' Association in Virginia. It has been one of the most successful marketing associations in the country, but they tell me one man is boss; he is czar. They have to grow these potatoes and pack and deliver them as he says and buy the seed he says. They tell me he has made everyone of them rich. Such an association should be around each shipping point with a central packing house. If they could put up one brand of apples, packing say thirty thousand barrels a year, and have them every year, don't tell me I could not sell them. Put the apples into grades where they belong, and sell them for what they are and you will have no trouble selling them after the brand has become known as an honest pack.

One thing is sure, I have learned how to pick cherries, and am taking home with me the finest "contraption" you ever saw. I have enjoyed this meeting very much, and would very much like to see any of you come to the New York Fruit Growers' Association which meets in Rochester, N. Y., Jan. 7-9. You will find a lively bunch of fruit growers.

DISCUSSION.

Mr. Smythe: How did the Fruit Growers' Association come out that was started a few years ago, to co-operate in selling?

Mr. Case: I have been identified with the New York Fruit Growers' Association ever since it was organized. I was on the executive committee for several years as chairman, and I think that the executive committee was more criticized for not developing a co-operative marketing scheme than for all the other things put together since the society was organized. But none of us have ever been able to map out a scheme to take care of all the large and small growers, that we thought was practical—that would work out. I was president of the Association when that Association was formed, and as I look back at it now I think I would have joined if I had not been president of the Association, but I was determined that I would not get a lot of people into any scheme where I could not see daylight myself. If I want to spend my own money, all right, but am not going to lead a lot of others into it. Before it was organized I looked up the manager and found he was a periodical drinker. He would go for months without drinking, and then there might be two or three weeks when he would be no good. It was landed in the hands of a receiver—no good at all. If you can only get the fruit distributed as bananas are distributed. If you could give every man, woman and child in the United States an apple apiece every day in the year, it would take ninety million barrels to feed them. Distribution systematically is what you want.

A Member: Just put right down in your minutes what Mr. Case says about putting a boozier at the head of an Association. That is all.

Q. Who has packed according to the Sulzer law and with what results?

Mr. Case: It is practically what we have been using for years; you stamp on the package what the size is.

A Member: Do you pack what the size is under this brand?

Mr. Case: No, I would rather use Case & Company's brand. You

want to use the Golden Rule in packing fruit. You want to pack it just the same as you would want to buy it, not from a religious standpoint but from the buyer's.

A Member: There were some that were afraid to commence packing under the new ruling, but I know several who had no hesitation in packing and no complaint was ever made.

Q. Will it pay to make more than one picking of winter apples?

Mr. Case: More than one picking? Yes, if they are properly thinned, but in orchards that are not properly thinned it is absolutely necessary. There is the Northern Spy and Wealthy—a great many varieties need several pickings.

Q. Who has had success with "Pyrox", Niagara "soluble sulphur", "Scalecide", prepared Bordeaux paste, etc.

Mr. Case: The soluble sulphur we used last year; we used the lime sulphur and soluble both, tested them side by side, and we intend to use the soluble sulphur entirely next year. There is a little difference in the cost of the soluble sulphur. It is a little dearer, but it is a little more pleasant to handle.

A Member: It is not good for the codling moth.

Mr. Case: No, lime and sulphur is not considered an insecticide; it is a fungicide.

A Member: What will it kill besides scale?

Mr. Case: I know Mr. Teets said they could kill aphid by using one to 50 and soaking the trees, so I started out by using lime and sulphur and soaked the trees and never harmed them a bit. Then I used one to 40 and never harmed them a bit, and then one to 33 and one to 25. Anything below forty scorched the fruit. I think there are very few insects that it will by contact, but I like it for a fungicide.

Mr. Munson: How about the Bordeaux Paste?

Mr. Clark: We used the paste this spring in comparison with the home mixed Bordeaux, and also with the lime and sulphur, and the results were very inferior.

Mr. Munson: Did you try it on grapes or apples?

Mr. Clark: No, we have no bearing apples. Our trial was on peaches for leaf curl.

Mr. Roach: I would like to ask about the prepared Bordeaux in the dry form.

Mr. Munson: We used a paste this year in the vineyard and it is very easily put on. It is a preventive, and we got a good crop of grapes. It is very much easier put on than the home mixed. I didn't know of any powder.

A Member: I also wish to say we got that for the purpose of trying it out. We used 49 gallons of water that spring, and we also tried it at 42 gallons, and we tried it in comparison with lime and sulphur and the home mixed Bordeaux and the results were very inferior, so we stopped using it.

Mr. Sherwood: I would like to ask Mr. Case or Mr. Farnsworth if they would use lime and sulphur for spraying before the leaves were out. I used to use the Bordeaux, but now I use lime and sulphur.

Mr. Case: I believe it is advisable to go back to Bordeaux mixture for some things. The trouble with the Bordeaux is that you will rust your Greenings and your Baldwins, while you hardly ever rust with lime and sulphur, and we consider it the best fungicide on apples. We

do not use but little lime and sulphur on pears, especially the Duchess; we went right back to Bordeaux mixture on sour cherries.

Mr. Farnsworth: In Ohio where they have a different climate and they are subject to fungus on apples, we got better results with Bordeaux for this fungus, but we have been using lime and sulphur also for the third season and we saw no rusted fruit, and we like it much better than the Bordeaux. We found it almost impossible to spray with Bordeaux without getting rust.

Mr. O. K. White: On apples, pears, cherries and plums I have been making comparative tests with lime and sulphur one to 40, and testing 32 to 33, and with Bordeaux Mixture 44 to 50, for the past two seasons. As far as effectiveness is concerned, I would not give a snap of my fingers for it for fungus diseases. In many cases lime sulphur has been superior to Bordeaux on Snows.

Mr. Rogers: I used Bordeaux this year for the spraying after the blossoms fall and just as the buds were beginning to swell, and had a little rust on the Wagners, but that is the only variety. The only objection I find to Bordeaux is that you cannot use it with the nicotine; it has some detrimental effect with the Bordeaux Mixture. It can be used with perfect success in the mixture of lime and sulphur.

Mr. Munson: Why are you using nicotine?

Mr. Rogers: For aphids.

Mr. Gray: What is the effect on sweet cherries with lime and sulphur?

Mr. Case: We are fully convinced we hurt our sweet cherries quite seriously in 1910. They did not develop any fungus disease and the only solution we could find was that the cherries were injured by this lime and sulphur. It just effected the fruit—not the foliage.

In the first place we put a spray on just after the bloom drops; we add arsenate of lead, about three pounds, or blue vitrol—2 pounds, to a gallon or two gallons of water, and after the cherries get started we put on another spray. If we have quite a lot of wet weather we put it on two to fifty gallons of water so as not to spot the cherries.

Mr. Munson: I think Mr. Paul Rose sprayed his cherries up to nearly the time of ripening with Bordeaux, and they kept a long time without rot.

Mr. Rogers: Nine years ago I did my first work for Paul Rose, and that was the first year he sprayed these cherries for brown rot. Before that he had a great deal of trouble with the ten-pound boxes rotting before they got to market, and lots of times before they left the farm. He sprayed that year with Bordeaux mixture, and the commission men put in a slight objection because some of the cherries were spotted. That was the beginning of the season, but that same commission firm later wrote him that those spots were just what he wanted to see—that the cherries were keeping nicely and he could afford to spray them.

Mr. Case: I would like to ask if there is anyone here who has found a mulberry that will ripen at the same time as the Black Tartarian cherry, for the birds to feed on.

A Member: How about a raspberry?

Mr. Case: They will not leave the cherries for that. They like the Black Tartarian, and I would like to find a mulberry that will ripen with them. They all ripen when the Black Tartarians are half gone and

we lost the cherries out of the tops of the trees, and then as soon as the mulberries got ripe they left them.

Mr. Gray: We use a Russian mulberry for that purpose somewhat. They begin ripening with the Black Knights.

Mr. Morrill: I would like to ask the value of the powdered lime sulphur in comparison with the liquid lime sulphur.

A Member: I cannot add anything to what Mr. Case said: I have not seen hardly any of it used. Cannot get any better results with it; there is practically no difference.

A Member: I would like to ask a question about the prepared Bordeaux mixture. One of my neighbors thought that was a little better than he could mix it himself. I think I can make a Bordeaux that can stand up in any shape. The Bordeaux we get in the dry packages seems to separate; in a little while the particles will float by themselves, and it doesn't look as though they would stick on the leaves. I would like to ask someone with experience in that line.

Mr. Bassett: I have only part of the account. I was asking Mr. Case his experience with it; I asked him the effect in killing scale, but he says "we don't have any scale." Our practical use for lime-sulphur is for killing scale. Now as far as this Bordeaux paste or any of these prepared mixtures is concerned, the home mixed is a great deal better in my opinion; keep away from the whole outfit. Why should any man who has any ingenuity want to buy this prepared stuff when he can make it just as well and know what he has when he gets through.

A Member: The prepared Bordeaux is cheaper.

Mr. Bassett: I would like to ask how anyone can get this mixture to you cheaper than you can make it yourself. The only man who should use this is a man who has a single tree in his back yard and doesn't want to use but a little. You all know Mr. J. C. Woodman of Paw Paw; you may have heard him speak at some farmers' institute. He tried using Bordeaux paste on his potatoes and paid dearly for the experience. He said "you can't get any more of that paste on me or on my potatoes." There have been disastrous experiences. A man can make a cheaper Bordeaux mixture than any company. It is rather a disagreeable job, and if you want someone to take that job away from you, all right, but as a rule you had better buy your material and make it yourself, and know just exactly what you have. I would just like to ask you to look into this thing. Take the manufacturers of this soluble sulphur—it has no analysis.

If that material can be purchased cheaper and will do the work just as well, go after it, and I will buy it too, as we want to get something that will do the work cheaper and easier. But until we are sure, it is wrong to put this stuff out. Look over the testimonials and you will find they are all from hardware stores, etc. "I sold so many tons of your stuff last year." Not a single testimonial that said "I used your material and got good results." When I found Mr. Case didn't have any scale on his farm I found his experience was not valuable as far as killing scale was concerned.

Mr. Case: I think the ground was well taken, and if I had some scale I would give it a thorough test. I have no scale, so know nothing about it.

Mr. Farnsworth: I bought ten barrels of prepared Bordeaux and had three spray rigs, and they went through my orchard and put on about

half of it. I thought before I got my men satisfied, my tanks cleaned out and my disposition cooled I would have nervous prostration. I sold the remaining five barrels to my neighbor and he had the same experience.

A Member: Is there not another side to that question? Isn't the soluble sulphur easier to put on? With lime-sulphur you have to get a good man that will go out and spray and get this lime-sulphur in his face.

Mr. Case: You will spray the tree—not the man.

A Member: I think that the soluble sulphur does the work just as well.

Mr. White: I have a good many opportunities to know of experiences with the Bordeaux paste and Bordeaux powder, and you are the only man in the whole state of Michigan that got any results at all.

Mr. Munson: You cannot tell about the results on grapes; you either have the rot or you don't have the rot.

A Member: There is a young fellow here who was in college last year and made tests with several things as the basis of his thesis for graduation.

Mr. Pickford: We used scalecide. We sprayed in the fall and the spring both, and part of those we sprayed in the fall were sprayed in the spring and part were not. We examined scale and found many of them alive. Then we sprayed again and examined them with a microscope, and found that the soluble lime and sulphur was just as effective for scale as lime-sulphur; it practically killed 100 per cent of the scale. We made tests on green house plants for green aphids—every spring—and it didn't kill aphids, but it is as well for scale as lime and sulphur or home-made lime and sulphur.

A Member: I would like to ask the young man that was talking how soluble lime and sulphur results compared with the liquid for fungus.

Mr. Pickford: We simply used it as a test with scalecide for aphids.

FRUIT GROWING ON SAND BY A SANDY FARMER.

W. D. BAGLEY, OLD MISSION.

By the term sand, I mean the kind of soil characteristically described by Prof. Smith, formerly director of our experiment station, who described the soil of their station at Grayling, Mich., as "very sandy sand."

Sandy loam with a good heavy subsoil is about the best soil for all kinds of crops, but the soil of which I speak has no subsoil any better than that on top—in fact in improving such soil the best part of it is always that on top.

I want to say in the beginning of these remarks that the state and national authorities are right in saying that such soil is non-agricultural; they go even further than that, declaring that it is nothing less than a crime to sell such land to a poor man with the expectation of making a living on it. There is no excuse for any person locating on such land except necessity. There are still thousands of acres of cut-over hardwood lands with good soil in Michigan for sale at moderate price, and

it is better for a poor man to run in debt for good soil than to take pine barrens as a gift if he intends to make a living on the land. The 80 acres on which I have made my home the past 25 years was formerly part of an estate of which I was executor and which I could not sell at any price worth mentioning. Thus it was necessity and not choice which started me farming on this kind of land.

This necessity was doubled a few years later by the apparent certainty of a railroad being built from Traverse City to Old Mission at that time, which if done would destroy the only means I had at that time of making a living, that of forwarding fruit and farm produce by water, which occupied my time only late in summer and the fall months. It will thus be readily understood that I was not a bloated bondholder farming for fun. There was but little published data at that time, 1887, to assist me in building up this barren soil, so I had to work out the problem mainly myself, necessarily doing the manual labor also. At first I tried general farming with rotation of crops in which clover was one crop. I soon found that clover would not grow in any degree worth mentioning, and as I could not raise farm crops in paying quantities to feed live stock, I abandoned all idea of making a living by general farming on such land. In fact I have never raised, even after years of careful and expensive upbuilding of this sand, more than 15 bushels of ears of corn per acre and one-fourth ton of hay per acre. But Old Mission was already known to have a fine climate for fruit and I decided to plant an orchard. My first planting was in the year 1895, seven acres of sour and sweet cherries, also Wagner and Duchess apples. Next year I planted 6 acres more, mostly cherries and crab apples. I put commercial fertilizer under every tree, mixing the fertilizer with the soil to avoid burning the roots. I grew a crop of corn among the trees which was well cultivated and fertilized with commercial fertilizer. Both the years 1895 and 1896 were extremely hot dry summers with very little rain. I have always believed that it was the fertilizer which prevented the trees from entirely dying, which not only furnished plant food in available form but helped hold the moisture around the roots.

As it was the trees barely lived, some of them did not live. A few years after, 300, practically all, my English Morello trees died, partly because this cherry is hard to start and a poor grower at any period of its life, partly long continued hot dry weather, and partly because they were not sprayed. Two years in succession the leaves turned yellow and dropped in the middle of the growing season. Then came a hard winter and they all died. To show how little we fruit growers of Old Mission knew about spraying at that time, I asked the question of the famous Peninsula Farmers' Club about spraying my young orchard. All the members present at that session said they did not consider it necessary to spray young trees; that spraying was necessary only for bearing trees. Nearly all the Morello cherry trees in this township died at the same time from the same causes here shown. The almost total widespread loss of this cherry, when it had been thoroughly discussed, and especially when it was found that the few Morello cherry trees that had been sprayed with Bordeaux, if in a favorable location as regards frost, had survived the cold winter led to a much more general and thorough use of this fungicide.

This kind of soil is almost totally lacking in all the elements of fertility. The first necessary step in building it up is to fill it with

humus and it must be supplied every year at first in some form as the sun burns the humus, and it becomes exhausted from washing away and other causes.

The first step I took was to purchase an old straw stack and six hayrack loads of corn stover in the spring of 1896, spreading this evenly over the ground then plowing it under, having help to put the straw and stalks in the bottom of the furrow to have it all plowed under. The effect of this was manifest in the darker color of the soil.

Next year I planted fodder corn in drills, and after the corn was fully ripe, plowed the entire crop under in the fall, running the plow crosswise of the rows, using a chain to tuck the stalks under. The cherry trees I had planted made a slight growth, except the Morello, but the apple trees made no growth for 4 years. They barely lived, until I bought a quantity of hen manure and put a shovel full around each apple tree on top of the ground and hoed it in.

This gave them their first growth, and with the help of yearly applications of humus in the form of matured crops plowed under, a little stable manure and some commercial fertilizer applied to growing crops among the trees, they have made a good growth every year since.

I am not in favor of the use of raw bone meal as a fertilizer for young fruit trees on sand, it is too slow to act. Nitrate of soda, hen manure, or some other highly concentrated form of nitrogen, placed on top of the ground near the tree and hoed in is much better, or best of all, four forkfulls of good stable manure just after the tree is set. This latter not only is a good fertilizer for this and a number of succeeding years, but also, what is most important of all, the first and most critical year, it aids greatly in keeping the ground moist around the roots of the tree, for it is mainly from the roots becoming dry that the newly set tree dies. The third year I sowed part of the orchard to rye in August, hoeing around the trees the following summer, and plowing under the following spring. This was not very satisfactory as there are better crops to raise to plow under for humus than rye alone. I might say right here, that years before planting this orchard I was thoroughly convinced that green manuring is of very little value as humus, and I have never practiced it.

Sand becomes very hot in summer, especially if accompanied by long continued dry weather and the crop, if plowed under in the green state in the hottest part of the year, being nearly all water at that stage of growth, nearly all evaporates and makes but little humus. If the green crop is plowed under in May it has made so little growth as to be of still less value. Green manuring on heavy soils may be a very different proposition, but I am speaking entirely about light sandy soil—"very sand sand."

My 18 years of observation and experience have still further confirmed me in the practice of plowing under matured crops for humus.

I tried clover in the orchard, sowing the center of the tree space, cultivating a narrow strip on each side of the tree rows. I discontinued that practice for two reasons:

1st. It takes $1\frac{1}{2}$ years to develop the clover plant, during which time the trees have but little cultivation.

2nd. The soil of the orchard was not yet in condition to grow a good crop of clover.

I plowed this clover under after 3 years, not taking any hay off. I

shall have something to say about clover further on. I next tried Canada field peas, at first in part of the orchard, and afterward, being greatly encouraged in all the orchard which by this time covered 20 acres. One of these years I planted peas in one section of the orchard, and corn alongside the peas.

I was much gratified to note the fact that the portion of the orchard in peas, even where the trees were not hoed, made as good growth as that in the corn, which was cultivated and hoed and which also had a moderate application of commercial fertilizer. I plowed under the entire crop of peas, buying new seed each successive year.

I sowed the new seed on the ground before plowing and thus with one plowing I put in both the old crop and the new seed. I found this method, plowing in the seed 4 inches deep, the best way, as the peas are less likely to dry out in summer, beside this reason, I had no drill and the peas are hard to cover up unless put in with either drill or plowing under. By this method the orchard received a three fold benefit, fertilizer, humus, and a cover crop, as the peas lay where they grew until the following spring before being plowed under.

About the only objection to the peas was that some years, in a long continued drouth, the sand would become so hot as to scald the vines as they had no other plant to climb upon, so I decided to try vetch as that legume was coming into prominence as a soil renewer.

At first I tried vetch alone, and since that rye and vetch together, half a bushel of each seed per acre. I was unfortunate in being imposed on by my seedsman, who sent me vetch seed that was about one-half cockle. I am trying to destroy that pest by pulling it out while in blossom, a very expensive and discouraging job. As usual I leave the rye and vetch to grow to maturity and plow under the crop when the seed is ripe enough to grow, except about 2 acres of the best of it, which I cut and threshed for seed and now have nearly all my orchard seeded with rye and vetch, about 30 acres of this seeding. Part of the new seeding was done in standing corn and cultivated in about Sept. 1st.

At date of this meeting it has made a splendid stand, and growth enough to ensure a good crop next season. The soil in the older part of the orchard has, by the practice as shown in this paper, become good enough for clover and in my 8 acre portion of the orchard seeded with clover a year ago last September, the clover is as rank and as fine every way as on the best quality of land anywhere. August is by far the best time to sow both rye and vetch, also clover, on sand. When clover is sown in spring it often dries out and dies, and the young tender plants are easily destroyed by the hot sand burning the leaves. My method of putting in clover seed, also rye and vetch seed, is to sow broadcast on the rough furrow and drag it in with spring tooth harrow, then with spike tooth harrow and finish with the float.

The float is one of the best tools in my orchard, home made. I do not use a disc. For years I owned a half interest in a disc, and after thorough trial for several years I have become disgusted with its failing to come up to expectations. There is nothing that the disc will do on sandy ground but what a spring tooth harrow will do much better, and the latter is easier on the team and costs only one-fourth as much in purchase money and a hundred times easier to keep in order and repairs. Of course sand never becomes lumpy.

I have tried cow peas and soy beans and have come to the same con-



O. K. White, Field Agent in Horticulture, M. A. C., inspecting the A. A. Lasch Cherry Orchard, near Suttons Bay.

clusion as Prof. Smith who said at a farmers' institute, "why monkey with cow peas and soy beans in this northern climate when field peas are so much more satisfactory." When I commenced my work as described, it was no trouble to keep down grass and weeds, they would hardly grow at all, but sowing grain crops and legumes so many years which helped the grass and weeds to grow without any hindrance, and the gradual building up of the quality of the soil, together with my absence from the orchard as before mentioned, earning my living for the entire year during the late summer and autumn months has resulted in establishing a heavy sod under the low headed trees, which it seems impossible to control without great labor, as during the rainy fall months the grass was not touched, and therefore took possession, and this was greatly helped by the stable manure and other fertilizer placed around the trees at the beginning of the season.

I have always used commercial fertilizers but of late years have used high grade phosphate and muriate of potash, purchased through the State Horticultural Society, sowing each kind separately and at different times broadcast over the entire surface of the part of orchard I wish to fertilize and harrowing in each kind separately. I sow the fertilizer from the rear of a wagon, sowing with both hands a strip 20 feet wide as fast as the team can walk. I seldom buy nitrogen as I grow that in the legumes, but sometimes use nitrate of soda to give unthrifty or newly set trees a boost.

The plowing under of the whole of a matured crop of rye and vetch is not an ideal way of seeding, it puts seed in too thick to raise good seed to harvest but it furnishes the soil with an immense amount of humus and also much fertilizer that is stored up during the growing season in the roots of the vetch. I feel that in rye and vetch I have an ideal crop for the orchard, free from every objection that I have presented against the other crops I have plowed under in past years. The vetch climbs up on the rye and thus is not scalded by the hot sand, it matures in one season, it furnishes the most humus of anything I have tried, both rye and vetch are hardy as an oak, and it can be plowed under after the rush of cultivating and cherry picking is done. The vetch matures about ten days earlier than the rye but that is no great objection; it does delay the plowing that much if it is desired to plow under both grains ripe enough to seed themselves, but this can be managed by sowing half a bushel of new rye seed, costing about 35 cents per acre, and plow the standing crop as soon as the vetch is ripe.

This year as already mentioned I cut two acres of rye and vetch for seed. The vetch, being very ripe shelled some in handling it so that there was a partial seeding on that 2 acres of vetch but no rye.

Most of this 15 acres of rye and vetch was plowed under the first half of September 6 inches deep, yet enough of it came up through that 6 inches of soil to make a heavy seeding.

I was warned by some of my neighbors that such late plowing with no previous cultivation of the orchard during the season up to September 1, was dangerous, that it would result in causing new growth on the trees, and that the new growth thus made would winter kill; perhaps the whole tree would die. I replied that I could not afford to buy \$150 worth of vetch seed and I was sure it would be all right to plow it under ripe. There has been no new growth. The trees standing in this

rye and vetch made a splendid growth early in the season. This is the second year I have done this with good results.

There are 3 reasons for this; 1st, Sand being very warm soil matures all vegetation early. 2nd, The new growth of the seed plowed under tends to check all new growth of the trees. 3rd, The straw and roots of the rye and vetch being mature decompose very slowly.

I believe there would be much more danger of there being overgrowth of immature wood if the rye and vetch had been plowed in the green state, say in June.

I think strongly of harvesting all my rye and vetch next year when fully ripe, threshing it, which would give plenty of straw to use in the stable, thus increasing the amount of stable manure returned to the orchard, also quite an amount of seed to sell, after sowing the usual bushel per acre, and the roots of the old crop are left in the ground.

The best way to harvest a crop of vetch alone, for seed, is to allow it to become dead ripe and then the vine will break loose from the ground when gathered by a horse rake, leaving the roots in the ground; the roots being the most valuable part of the plant as a soil renewer. By thus taking off alternate whole crops of rye and vetch, and plowing under the whole of the other alternate crop, I believe the orchard can be sufficiently supplied with humus and partly, at least, supplied with fertilizer, especially after so many years of plowing under matured crops every year.

This, however, could not have been done at the beginning of such soil building without detriment. The clover part of the orchard I shall cut for hay next June and leave the second growth on the ground. I have done this already in a block of cherries and crab apples situated on a big hill. It is very important to keep such steep hillsides seeded as much as possible on account of the heavy rains making gullies and spoiling the entire surface of the hill for future use, both in difficulty in plowing and in taking all the fertility and humus out of the soil. Therefore, to give the trees some cultivation and prevent erosion I have spaded and hoed a wide circle around the trees and fertilized with commercial fertilizer, sometimes muriate of potash, sometimes with phosphate. In this way I get crops of fruit and one crop of hay each year and keep the hill in good condition for future use. Having some degree of success with this hill has caused me to commence clearing several adjoining hills for the same purpose, especially as the hills have better soil than the orchard already in bearing, and are nearly immune from spring frosts which have taken most of my profits the past four years by destroying the bloom. Most of the spraying will have to be done with a Knapsack sprayer, but this work can be done effectually by planting Morello cherries and which need no ladder in picking.

After setting out Morello cherries on these hills, first pulling out the stumps and plowing the ground, the trees should be cultivated with a hoed crop one or two years and then I intend to seed to alfalfa and hoe a circle around each tree, etc., as before mentioned. This means a lot of extra hard work but I believe it will pay in the long run.

The varieties of fruit that proved most valuable in my experience have been in the following order: 1st, sour cherries; 2nd, Hyslop crab apples; 3rd, Duchess apples. The Wealthy is as valuable as the Duchess but I did not say much about them as a class, having only about a dozen trees of that variety, but the past few years they have brought higher

prices at Old Mission than the Duchess, and in addition have stronger crotches, the fruit does not blow off as badly as the Duchess, and coming when the weather is cooler do not scald on the ground if they do fall off.

Winter apples, pears, sweet cherries and currants seem to need a heavier soil than sand; a good subsoil. I have tried a good many fruits and vegetables in my garden near the house, a very frosty location. I have found tree fruits do better than bush fruits as they root deeper. Among vegetables, peas, and carrots and early potatoes are most easily raised, the latter being fertilized liberally with potash. Most of the fertility in my garden is supplied from the slops and ashes from the residence. In setting fruit trees I regard it as very important to put the best top soil in bottom of the tree hole, and the barren subsoil last of all in filling up the hole.

About a dozen years ago having found that about 100 of my sour cherries were not true to label, I started in to graft these Louis Philippe over into Montmorency and I have been at this job off and on ever since. The sum of my experience is that it *don't pay*; better pull out an unprofitable variety of cherry as soon as discovered and set a better one at once. A few of these grafted cherry trees have grown until they are the full size of stock on which they are grafted and have borne full crops of fine fruit for several years, but most of the scions died the year they were set, some bore fruit a few years and then died, quite a number of the original trees died in consequence of so much heavy cutting of limbs. This fall I have pulled out about 25 of these trees and set Montmorency in their places, after losing so much time and expense. One of my neighbors has the same experience and has arrived at the same conclusion as my own.

Buying so much hay and other feed for the livestock necessary to every farm has been a heavy expense, so that about a dozen years ago I began experimenting with the intention of raising much of this feed. Again I refer to Prof. Smith, with whom I was in frequent correspondence at that time. Following his advice I planted half an acre with sand lucerne. The seed proved to be too old and was a failure. The second planting of half an acre seemed to be a success and I was much encouraged, although I had some trouble with June grass. I summer fallowed these half acres to have a clean seed bed but June grass has a way of appearing to be dead and then coming to life in the fall as strong as ever.

I prepared a summer fallow of six acres with unusual care, running the spring tooth harrow over it frequently all spring and summer. In September on Prof. Smith's advice I sowed 3 acres of this piece to sand lucerne but it all winter killed. The remaining three acres I harrowed twice the following spring and sowed it thick with the lucerne in May but it was, as usual very slow in starting and most of the seeding was again choked out by the June grass, a most grievous disappointment. I cannot recall at the present time anything being said about bacterial inoculation of seed—I think this important essential is of later discovery. For some years I abandoned all effort to raise hay but in recent years I have, by inoculation, obtained a fairly good stand of alfalfa on one of my steep hills.

“Hope springs eternal in the human breast.”

During the first eight years, however, I had many setbacks, some

which I have here set forth; some years I could hardly keep my head above water, financially, but I kept the orchard growing.

Then came the great year 1903, great not only for me but for everybody in this region who had good varieties of fruit in bearing and had taken good care of them.

Not only a big crop, but what is still more important, a big price. With so many years of good care of my orchard, 90 per cent of my fruit graded fancy. Every Duchess apple tree, every crab tree had to be well propped and even then some branches broke with the great crop of fruit and the limbs of the cherry trees bent to the ground.

This one crop paid for every fruit tree both living and dead I had set in that eight years, for every other cash expense and the orchard stayed with me, pay in future years for my toil and management. I was so much encouraged that I determined to plant a big crab orchard on the piece of land already mentioned, where I had tried and failed with sand lucerne, which is really a sand dune. This 10 acre block of Hyslop crabs has been kept growing, first with fertilizer under the trees and stable manure around them on top of the ground and since then with several matured crops of peas plowed under, and more recently with rye and vetch. These trees have made good growth each of the six years since they were planted, and are now ready to produce paying crops.

Hyslop crab, while fairly profitable, has some drawbacks; it is subject to blight same as pears. I have lost 200 trees from this cause in the past 6 years. This fruit is slow to pick and must be placed on the market in very limited time as they are in demand only a few weeks, beside that they become mealy and therefore worthless if left in the orchard too long.

Crabs would not be profitable much south of this region as they would mature too early there.

Since the year 1903 I have had several good crops of fruit but the past four years spring frosts have taken most of the profits, but the first year the trees are full of fruit there will be profit enough in that year to tide over several poor years and "thus will our winter of discontent be made glorious summer."

Most of this orchard is still young and this fall I have weeded out unprofitable and dead trees and replaced them with varieties well known to be profitable and thus I am full of hope for the future.

The word and the sentiment, hope, is what keeps us to our life work, and the right way to spell that word is h-o-p; HOP LIVELY.

DISCUSSION.

Mr. Cheney: Do you find by letting your crop mature you lose your moisture?

Mr. Bagley: The trees are matured in their growth that year, and don't receive any benefit that season. The danger was in keeping them growing too late, but have had no trouble.

A Member: Don't you find that if you had a crop on the tree they would lack moisture? Do you cultivate in the spring?

Mr. Bagley: Certainly. My paper was so long when I was reading it over, but I saw many points that were not covered. I sow the center of the strip. My trees are twenty feet apart each way. I refer to what Mr. Case said yesterday about planting close together and then taking



R. H. Sherwood in his fine orchards near Watervliet. He is not only one of the largest fruit growers in Michigan but has one of the largest circle of friends, won by his clean character and happy disposition.



C. E. Young among the Jonathans in his orchard, Rives Junction, Jackson County.

them out when they crowd. I don't sow anything close to the trees; leave it so I can run a spring tooth cultivator around the tree space, and the trees have had this amount of cultivation. Three years ago when I cultivated my crab trees I went over them on my hands and knees three times and hoed them with my fingers, and found a cut worm every time. You will find these insects worse on sandy land than on any other kind of land, and crab trees will develop things you never heard of before. It is true a crab tree is well adapted to that kind of land, and you can make it grow just as well and better perhaps. I sow seed, and fertilizer and everything from the rear end of a wagon as near as I can about twelve feet out of that twenty. That leaves strips on each side to run the cultivator during the season and hoe around the trees.

FINANCIAL REPORT.

Report of J. Satterlee, Secretary of the Board of Trustees of the Lyon Memorial Fund.

Lansing, Mich., June 25, 1913.

At a meeting of the Trustees of the Lyon Memorial Fund today at the residence of Secretary Satterlee in the city of Lansing, there were present Chas. J. Monroe, President, Charles W. Garfield, Treasurer, and James Satterlee, Secretary. Mr. Monroe presided and asked for a report of the treasurer.

Mr. Garfield, as treasurer, reported the following assets of the fund.

1 Morrill Orchard Bond	\$1,000 00
Worden Preferred Stock	2,000 00
3 Greenhouse Bonds	1,500 00
1 Detroit Gas Bond	1,000 00
Frank Dykema Note	345 00
1 Savannah Bond	500 00
1 Commonwealth Power, Ry. and Light Co. Bond	500 00
Consumers Power Co. Prefrd Stock	1,500 00
Cash in Bank	117 42
Total	<hr/> \$8,462 42

The Trustees carefully inspected the securities as presented and they met the approval of the entire Board.

No further business appearing the Board adjourned.

J. SATTERLEE,
Secretary.

Annual Report of Chas. W. Garfield, Treasurer of the Board of Trustees of the Lyon Memorial Fund.

Grand Rapids, Mich.,
Nov. 12, 1913.

To James Satterlee, Secretary:

I herewith present you my annual statement as treasurer:

LIST OF INVESTMENTS.

One Morrill Orchard Bond		\$1,000 00
Worden Preferred Stock		2,000 00
Greenhouse Bond		1,500 00
Detroit Gas Bond		1,000 00
Dykema Note		335 00
Savannah Bond		500 00
Commonwealth Power and Light Co. Bond		500 00
Consumers Power Co. Prfrd Stock		1,500 00
Cash in Bank		610 59
		<hr/>
		\$8,945 59
Lyon Fund	\$7,600 00	
Life Membership Fund	500 00	
Making a total of		8,100 00
		<hr/>
Leaving a balance of		\$845 59

For ready reference I give you a list of transactions during the year since I made the last report on October 21, 1912 to this date, as they are recorded in the bank book at the Grand Rapids Savings Bank:

1912		
Oct. 21	Cash on hand	\$2,399.86
Oct. 22	Paid State Society	\$714 86
Oct. 23	Investment—Consumers Power Co..	1,430 75
Dec. 2	Worden Interest	70 00
1913		
Jan. 1	Bank Interest	12 78
Jan. 2	Consumers Power Int.....	22 50
Apr. 14	Consumers Power Int.	22 50
Apr. 22	Morrill Interest.....	90 00
Apr. 22	Greenhouse Interest	43 80
June 2	Worden Interest	70 00
June 2	Investment—Commonwealth Power.	490 83
June 23	Dykema Interest	22 42
July 1	Bank Interest	4 72
July 2	Consumers Power Interest	22 50
July 2	Detroit Gas Interest	50 00
July 2	Savannah Bond Interest	25 00
Aug. 7	Morrill Interest	30 00
Aug. 29	Dykema Int. and Principal	13 45
Oct. 2	Consumers Power Int.	22 50
Oct. 2	Greenhouse Coupons	45 00
Nov. 11	Dykema Interest	5 00
Nov. 11	Cash in Bank	610 59

You will note that I have not enough on hand to pay the whole income for the year to the State Society because I have over invested, but I presume the society is not in immediate need of funds and I enclose herewith a due bill as treasurer of the Lyon Fund which I will honor at any time it is presented.

Very respectfully submitted,
 CHARLES W. GARFIELD,
 Treasurer.

Since receiving the above I have had word from Secretary Bassett that he had settled with the treasurer of the State Society for twenty-five life memberships received during the year which will be turned over to Treasurer Garfield to be added to the Lyon Fund which will make that fund \$8,225.00 besides the South Haven real estate.

It seems to me that the State Society is again to be congratulated on the wise provision made by T. T. Lyon for a permanent income for the Society, especially now that the income from the state has been cut off.

It is to be hoped that a large number of life memberships may be secured each year to add to the permanent fund, thus increasing the annual income and adding to the efficiency and scope of the Society's work.

At the formal meeting of the Trustees in midsummer, a report of which appears above, all the securities were carefully reviewed by the full Board of Trustees and found to be in a good and safe condition. The funds seem to be well invested and the income is unusually large for a trust fund of this character.

Respectfully submitted,
 J. SATTERLEE,
 Secretary.

Lansing, Mich., Nov. 26, 1913.

ELECTION OF OFFICERS.

The election of officers which followed resulted as follows:

President, J. Pomeroy Munson, Grand Rapids; secretary, C. E. Bassett, Fennville; treasurer, Robert Smythe, Benton Harbor; executive committee, Frank A. Wilken, Detroit; O. E. Ladd, Old Mission; J. E. Merritt, Manistee.

All of the above were re-elected except the last two, who are new members on the executive board.

BANQUET.

The annual banquet was held Wednesday evening in the church gymnasium and was in charge of the ladies of the church. After a most excellent physical feast, Mr. R. H. Sherwood, of Watervliet, as toastmaster, started a mental feast in which sense and nonsense were delightfully mixed. Mr. Sherwood is a born toastmaster and the list of

speakers he presented held the interest of those present for over two hours. One thing strongly apparent, was the loyalty of the Traverse City people who responded to toasts to their part of the county. Such a home spirit is to be commended. When everyone gives a boost something has to move for the betterment of the locality.

Mr. Case, of New York, responded to the toast, "Associated Effort," and took biblical times to illustrate the value of such effort. Prof. Eustace spoke of the Agricultural College and urged that all be friendly to that institution. He invited friendly criticism as well as encouragement. Mr. Hart, a student at the college, spoke on the subject of unified effort. In his talk he paid high compliments to Prof. Eustace and his ability as an advisor and teacher. At the close of his toast Mr. Hart called on the M. A. C. men present to give the college yell, which certainly well illustrated unified effort.

Mr. Farnsworth asked that we give more attention to the human factor in agriculture and strongly urged that we give more attention to the most important crop of the county, the boys and girls. Mr. Roland Morrill gave a short sketch of his early experiences in the peach business, which was full of value and interest.

It was only after Mr. Sherwood accused him of eating peas with his knife and thereby giving the plant breeder, Mr. Burbank, the inspiration to breed a square pea that Mr. Bassett, our secretary, consented to say anything. After coming back at Mr. Sherwood in good form he urged improvements in ourselves and our way of doing things.

The chief speaker of the Wednesday afternoon session was Roland Morrill, famous for peaches, of Benton Harbor, who spoke on the present status of the peach industry. In his very able presentation which was interspersed with many terse philosophical truths, he showed that in Michigan we had nothing to fear from competition of other peach growing districts. Statistics showed that in the aggregate this state was heavily in the peach business, but individually it was not. He said that the Elberta reigned supreme in the peach business and wherever it could be grown successfully this industry became of commercial importance. The time of ripening of this variety in this state gave us the advantage over other parts of the country as that time is the usual canning time for the housewives. Mr. Morrill made a special plea for honesty in packing so that the state could maintain an eager demand for this fruit.

STUDENTS' SPEAKING CONTEST.

The students' speaking contest opened the Wednesday afternoon session. Without exception the subjects were well selected, practical and well given. It was very difficult for the audience, who were the judges, to select the winners. The decision of the hearers was as follows:

1st. Ernest Hart, of Rochester, N. Y., whose subject was, "Does it Pay to Renovate Apple Orchards?"

2nd. J. A. Petrie, Kalamazoo, Mich., who spoke of the shot-hole fungus of the cherry.

3rd. A. L. Coons, Lowell, Mich., whose topic was, "Market Preferences."



J. E. Merritt's sweet cherry orchard, Manistee county.

The students' judging contest was won by J. A. Petrie, with I. R. Notteware, of Bellaire, second, and H. S. Bird, of Lansing, and A. L. Coons, tied for third.

Of the growers exhibiting at the fruit hall, A. J. Rogers, of Beulah, got first prize; E. W. Lincoln, of Greenville, second, and F. H. Hemstreet, of Bellaire, was awarded third.

Following are the addresses of the students:

DOES IT PAY TO RENOVATE APPLES?

ERNEST HART, ROCHESTER, N. Y.

(First Prize Article in Students' Speaking Contest.)

In the rapid advances made along the lines of pruning, spraying and marketing, the progressive horticulturist has been able to give little attention to the rotting of trunks and limbs of apple trees. But the most casual survey of the average orchard of 25 years or more will reveal the importance of this subject. Here we may find trees with large cavities or rot holes which are the result of decaying heartwood. At some time the bark has been injured, possibly a stub left in pruning or a limb has been broken off in a storm, exposing the heartwood. Fungi have entered and, in the presence of moisture, are eating away the heart of the tree, thereby destroying its chief mechanical support and shortening its life by many years. Not only will the tree succumb sooner but it cannot be depended upon to support a large bearing surface. The familiar sight of one of these effective trees, loaded with beautiful fruit, but hopelessly checked and split demonstrates this all too well.

The best way to cure a disease is not to have it, and as these fungi can only gain entrance into a tree through a wound in the bark, the preventative measures are very simple. If all prunings are made flush with the main limbs and all cut surfaces are kept covered with white lead or some similar substance the cambium layer will soon heal over the wound and there is no danger of fungus infection. On the other hand, if the rot has already gained a foothold there are two methods of combating it. First, to allow trained tree surgeons to come into the orchard and treat the trees at the rate of 60 cents an hour. This method is not to be advised, but if no other way can be found even it will pay in the end. The other way is for the grower to do the work himself. The operation is comparatively simple and if the workman is handy with mallet and chisel and has a little skill in dealing with cement he is bound to succeed.

The rotted parts of the tree are dug out and cleaned away until solid wood is reached, then some disinfectant such as creosote or coal tar is coated over the exposed surface to remove as far as possible the last traces of the rot organisms. The hole is then filled with concrete which is shaped on the surface to allow of good drainage. The purpose of the cement is to prevent the re-entrance of the fungi, to prevent the collection of excessive water and provides a strong, solid core to take the place of the decayed heartwood. In time a wound callous will grow

over the cement, and whereas before we had for a trunk a cylindrical support which was open in places and had a rotten center, we now have for a mechanical support, a closed tube with a solid center which is absolutely impermeable to fungus infection.

I call your attention to the following figures from a 12 acre, 50 year old Baldwin orchard in which I demonstrated that this work can be profitably carried on in a commercial way.

Four hundred and fifty trees were treated with a total of over 1200 cavities. The cost of the operation and materials was:

7 wks. labor—3 men at \$18 per wk.	\$378 00
3 loads sand	3 00
24 bags cement	15 00
Tools and repairs	15 00
Barrel coal tar	8 00
Total	<u>\$419 00</u>

Yield of the orchard—average year, bbls. ...	1,000
Average price per barrel	\$2.50
Total taken from orchard—average year	\$2,500 00
Cost of producing the crop in that locality..	<u>550 00</u>
Profit for average year	\$1,950 00
Cost of tree surgery	419 00

Thus if the work of arresting the rot prolongs the life of $\frac{1}{4}$ of the trees for 1 crop it pays for itself. But the life of all of the trees and all of the main limbs will be prolonged for several years and several crops. It is instantly evident that here is a profitable proposition for the grower and he need no longer sit helplessly by and see his valuable apple trees tottering with age when they should properly be in the prime of their bearing, for the application of these simple methods has solved the problem of successfully combating the rots which bring about premature death.

SHOT-HOLE FUNGUS ON THE CHERRY.

J. A. PETRIE, KALAMAZOO.

(Second Prize Address.)

“Shot-hole Fungus” or the Cherry “Leaf-Spot” is a disease of great importance to you people, who are growing cherries.

When the fungus is present in the cherry or plum orchards, it causes the leaves to turn yellow and drop prematurely, and occasionally all of the foliage falls to the ground before the crop is picked. This loss of foliage does not affect this year's crop so much, but by losing its leaves, the tree is unable to ripen its wood properly and is apt to winter-kill. It is also unable to mature the fruit-buds, which are to produce the next year's crop. The food necessary for the ripening of the wood and

the maturing of the next year's fruit-buds is manufactured by the leaves after the present crop is picked, so it is evident that if the majority of the leaves fall to the ground, the tree and the future crop will suffer.

For many years, it was not definitely known how this fungous passed the winter, and most people surmised that it either stayed in the twigs or else wintered over in the old dry leaves. Last year, B. B. Higgins, of the Cornell Experiment Station, discovered the winter stage of this fungous and proved to his own satisfaction that the disease winters over in the old leaves. On account of his discovery, the name of the fungous will probably be changed from *Cylindrosporium padi* to *Coccomyces heimalis*.

The disease first shows up as discolored spots on the leaves, which gradually enlarge. Later they become dark around the edges of the circular patches and pale in the centers. These spots wither, dry up, and fall out, leaving round, clean-cut holes, which resemble those caused by shot, hence the name "Shot-Hole Fungous."

When the disease has weakened the leaves sufficiently, they fall to the ground and dry up. There is a slow development of the fungous during the winter and the mature spores come out in the spring about May. These small spores are then blown about by the wind and fall on the young leaves of the cherry trees, producing new infections.

In controlling this disease, our work must be preventative rather than curative. We must have every part of the leaf-surface of the trees covered with spray, so that when the spores fall on the young leaves and start to germinate, the little germ-tube will come in contact with the caustic spray and be killed immediately. We must kill these spores before they get into the leaf-tissue for after they have gained entrance, we cannot affect them by spraying and they will spread the disease rapidly.

When we spray, we should have plenty of pressure so that we can throw the solution in a very fine mist, being careful to cover all parts of the trees, for if some places are overlooked, the spores will be sure to find them and there reproduce themselves.

Formerly it was the custom to spray with Bordeaux Mixture for this disease, but the Horticultural Department of the Michigan Agricultural College, carried on experiments using dilute lime and sulphur (1 to 40) instead, and found that it controlled the fungous perfectly and caused no burning of the foliage. Many people have been afraid to use lime and sulphur because they understand that it would burn the leaves, but Prof. White proved by his experiments, that if it was properly applied, no damage would result.

Since this fungous winters over on the old leaves of the past season, general clean-up measures and the burning of the leaves are beneficial and destroy the source of much of the trouble. Now if we do all we can to destroy the old leaves by early plowing in the spring, etc., which winter this fungous over, and then do a thorough job of spraying at the right time so that we prevent the spores from germinating, we surely will have the disease under control.

MARKET PREFERENCES.

A. L. COONS, LOWELL, MICH.

(Third Prize Address.)

As you came up the street this morning had you noticed closely you would probably have met a man wearing a red neck-tie; later on you passed one wearing a black bow tie and still another with a blue tie with white dots.

Now, what do these neckties have to do with apple production in Michigan? Just this.

As surely as the first man preferred the red necktie, so does New York City prefer the Rhode Island Greening and the Maiden Blush apples above all the others and dislikes the Hubbardston. Just as the second man preferred the black bow tie so does the South and Mobile and New Orleans prefer the Ben Davis which is best suited to their needs. Just as the third man chose the blue tie with the white dots so will Indianapolis pay nearly twice as much for the Hubbardston apple as will New York City.

Study the markets and the pay check will grow. This is a proven fact and not idle talk.

Ship the Baldwin to Boston where there is a particular demand for it. This apple, however, will sell well in all of the markets with the possible exception of New Orleans where there is only a partial demand for it. The Northern Spy will sell anywhere except in the South, to whose needs it is poorly adapted, and the Maiden Blush has a good reputation in all markets with the possible exceptions of Norfolk and Richmond.

Detroit and Boston like the Talman Sweet but this apple is little known in the other markets, Indianapolis, Cincinnati and St. Louis not wanting it at all. Except in the South, to which it is poorly adapted, the Snow apple is held in the highest esteem. The Gravenstein is not in demand in Detroit nor the South but New York and the other northern markets like it. The King sells well in both the North and the South and Detroit has a particular craving for the McIntosh, that excellent Christmas apple.

The baked apple trade of Baltimore, Richmond, Washington and to dispose of should carefully select their market.

Richmond, Buffalo and Milwaukee want the Wagner, and the Jonathan sells well throughout the north, also selling well in Mobile and New Orleans where it is classed as excellent. Cincinnati has a distinct craving for the Yellow Transparent, while Chicago and Buffalo want the Duchess. The Duchess, however, should not be sent to the South for there is little demand there for it.

Cincinnati also says, "Send me your Alexanders," but Indianapolis and St. Louis do not seem to want this apple. The other markets of the north will take this and the Wealthy apple in limited amounts, although New York and Pittsburg class the Wealthy as excellent. The Seek-no-Further is in demand in Baltimore and Buffalo but the other markets demand it only in smaller amounts.



The attractive "fruit piece," 17x26 feet, made in the Sanitarium gymnasium, Battle Creek, by O. C. Edwards, using 48 bushels of apples of different colors.



The Battle Creek Sanitarium auto truck hauling a 150 bushel load of apples from their own farm.

Just as these various markets prefer certain varieties, so do these varieties prefer certain seasons. It is folly to place the Ben Davis on the market in the fall. Keep it until May and dispose of it then. The Baldwin sells best during or shortly after December while the Twenty Ounce and the Wealthy should be disposed of before Christmas. The McIntosh is an ideal Christmas apple, bringing its highest price then, while the Rhode Island Greening reaches its highest price during January and February.

There is a time and a place for every variety. You need no one to tell you further, then, that there are increased dividends awaiting the man who sends his fruit to the right market at the proper seasonable time.

WHY FRUITS SHOULD BE PRECOOLED.

J. R. NOTEWARE, BELLAIRE.

The term precooling has been applied to the rapid and prompt cooling of fruit or other produce before it is shipped or stored. To the grower and shipper it is important as a means of extending the market area of a product by assuring its delivery in sound condition over long distances. Ice and salt or mechanical refrigeration are usually employed as the cooling agents and the object is to reduce the temperature of the fruit, as quickly as possible, to a point where ripening will be retarded, and decay and deterioration prevented.

During the maturing of a normal fruit, certain chemical and physiological processes are taking place within the fruit, which results in the acquirement of flavor and quality; this constituting the ripening process. After a certain point is reached the fruit becomes over-ripe, quality and flavor are lost and deterioration progresses until eventually the fruit is destroyed by fungous decay or fermentation or through destructive physiological changes. When the fruit is picked the ripening period is hastened and greatly shortened if the fruit is allowed to remain warm for any length of time. Hence the importance of reducing the temperature of the fruit as rapidly as possible after it is picked.

Aside from the breaking down from over-ripeness, fruits are subject to premature decay, due to the attacks of fungi. The most common of these, however, have not the power to penetrate the unbroken skin of healthy, normal fruit but injuries to fruit from rough handling provides an entrance for spores of fungi and decay occurs very rapidly if they are subjected to ordinary temperature for any length of time. The germination of the decay spores does not take place while the fruit is perfectly dry or the temperature low. After the spores have germinated, however, and decay has started within the fruit, even as low a temperature as thirty-two degrees Fahrenheit will not check it. Growth of the mold is only retarded and decay continues slowly to develop. Prompt and rapid reduction of the temperature of the fruit below the point where the decay spores will germinate, prevents the development of the disease and fruits that have been rendered extremely susceptible, through some mechanical injury, can be transported with only slight loss from decay.

These dormant fungus spores however, will become active when the fruit is unloaded, especially in hot, humid weather and such fruit will gain a reputation for poor marketing quality and be discounted accordingly. It is just as important that fruit remain in sound condition after its arrival, long enough at least to be sold and consumed, as it is to get it to market sound. So it is evident that precooling can not be legitimately substituted for careful handling in preparing fruit for shipment. It is in no sense a panacea for all the difficulties of carrying fruit in a sound condition to distant markets. It cannot improve the quality or condition of the fruit packed and can only temporarily retard decay, following injuries made by rough handling. But it renders unnecessary the packing of such fruits as peaches, plums, and apricots in a hard green condition in order to offset the ripening which takes place in cars under ordinary methods, thus giving a better satisfaction to the consumer and a more extended and profitable market to the grower and shipper.

THE CHERRY FRUIT FLIES.

A. H. HOLLINGER, DETROIT.

The earliest account of maggots working in American cherries was from Massachusetts in 1883. Six years later, the cherry growers in this region reported much damage from a similar maggot. It is very likely that maggots had been destructive before this in other localities, but the cause of the trouble was credited to the grub of the plum curculio. The fruit-fly is now widely distributed over the northern and central states.

The native food-plants were probably wild species of plum and cherry, but gradually it has acquired a taste for cultivated fruits, until now, all cherries, both sweet and sour, and occasionally plums, are attacked. However, it has a decided preference for certain varieties, such as English Morello, Montmorency, Downer, Black Cherries, and others.

The adult insect is a pretty little fly, resembling the common house-fly in general form, though much smaller. Its body is black and the head and legs are brown. Each wing is crossed by four blackish bands and has a black spot at its tip. These peculiar wing-markings serve to easily distinguish this fly from the adult of the apple-maggot or railroad worm and other near relatives, and render these flies quite conspicuous objects as they fly from cherry to cherry. All growers should familiarize themselves with the adult stage of this pest.

The eggs are deposited just under the skin of the cherry by the sharp ovipositor of the female, and may be laid in any section of the fruit. The egg-scars are mere punctures and must not be confused with the crescent-shaped scars made by the plum curculio. Egg-laying extends over a considerable period, from June till as long as cherries last. The fly lays about four hundred eggs and begins ovipositing about two weeks after she emerges.

In a few days the eggs hatch into yellowish-white maggots which penetrate to the pit, feeding on the flesh and forming an irregular rotting-appearing cavity. The fruit is not mined, as in the case with the apple-

maggot, but the larvae invariably work around the pit. As a rule, the maggots attain maturity simultaneously with the ripening of the cherries, and they thus find their way to the consumer. This is the only stage with which most growers and consumers are familiar. Until the maggots are nearly full grown, their work does not show on the surface of the fruit.

There is never more than one maggot in a cherry and unfortunately, it works in a very inconspicuous manner, so that it is difficult to determine its presence until the damage is wrought.

Infested fruit shows a decided tendency to brown-rot, and upon examining closely those cherries in which brown-rot was just beginning, the egg-punctures were seen in the center of the decay. For this reason, most of the fruit rotting on the trees has been found to contain cherry-maggots. It has been observed that few infested cherries fall from the trees, differing in this respect from the work of the railroad-worm.

The maggots are generally full grown by the time of ripening, and crawl out of the cherries and drop to the ground, where they transform to puparia and pass the winter and late spring within an inch of the surface of the ground.

Cherry fruit-flies have long been considered one of the hardest of orchard pests to control. Some remedies have been suggested, such as destroying the entire crop of infested fruit, or removing the top layer of soil from beneath the trees after the maggots have pupated. Such treatments have been of little avail.

There is now a certain means of destroying this pest. A spray, similar to the one employed against the railroad worm, is used. It consists of a mixture of five pounds of arsenate of lead, three gallons of cheap molasses, and one hundred gallons of water. This spray is not intended for the larvae, but is used for the adult flies that come to the trees for egg-laying and for feeding. The spray is not applied until the flies appear in the orchard, at which time the cherries are about half-grown and just beginning to color. There are usually two applications, one about the tenth of June, and the second about June twenty-fifth. The spray is applied through a syringe holding about one pint, and this amount will be sufficient for a medium sized tree, so little of the mixture being needed to kill the flies.

Results have been very gratifying. In tests, the fruit of unsprayed trees resulted in infestation of fully one-third the crop, while that of sprayed trees was remarkably clean, having only one-sixth of one per cent infested. The sprayed fruit also showed a noticeable lack of brown rot and of cureulio injury.

PRUNING OF NEGLECTED APPLE ORCHARDS.

MELVIN A. RUSSELL, LUDINGTON.

Pruning was one of the first operations devised as an aid in the production of fruit. Hours might be spent in discussing it in its many phases, but never the less I think that by attacking this limited subject, I can bring before you in a few minutes the more important points about pruning neglected apple orchards.

In spite of the well known fact that pruning is necessary in the production of good apples, many farmers seem to have labored under the impression that after an apple tree is twenty or thirty years old, it no longer requires annual pruning, but will thrive as well if left to its own resources as if pruned and cared for. As a result of this wrong idea, nearly every early settled neighborhood in our state has a number of old farm orchards that have become unproductive, unprofitable, and in many cases unsightly, through lack of proper care.

The importance of spraying and cultivation in bringing an old orchard into productiveness must not be overlooked. But pruning is usually the first task and one that greatly facilitates the spraying and cultivation which are to follow.

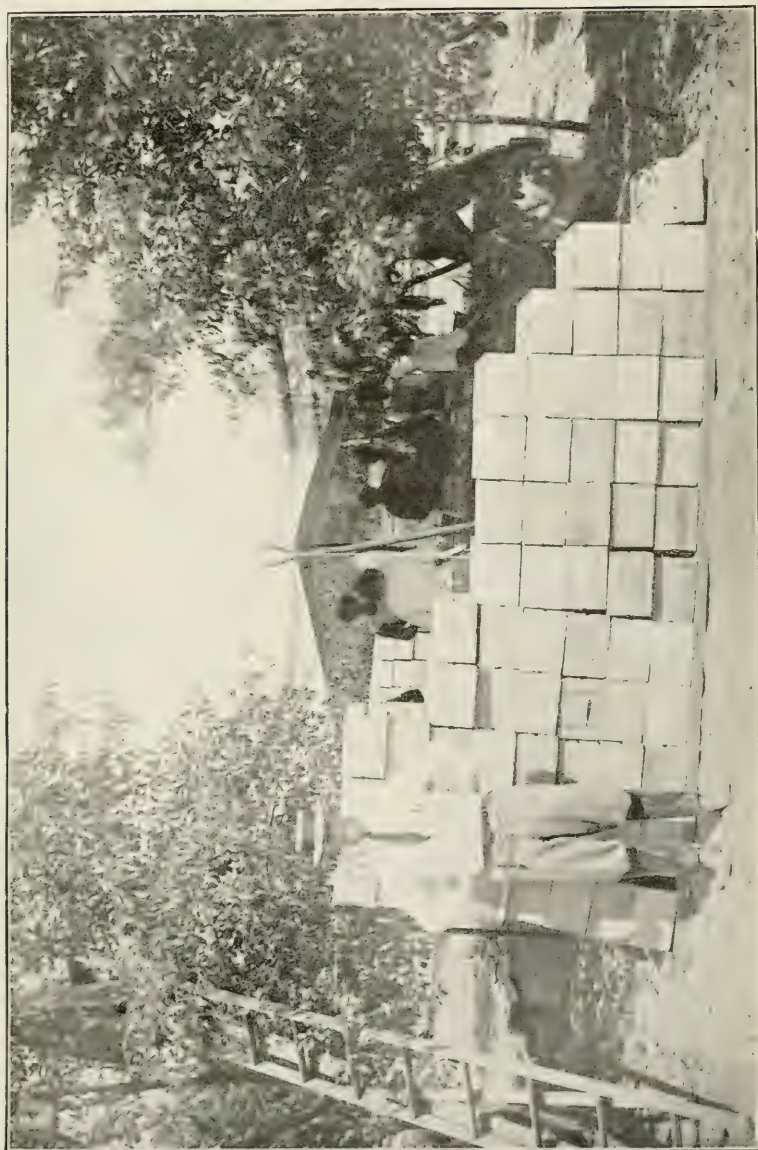
Broadly speaking, there are three objects to be sought in this kind of pruning: The dead branches must be removed, the head of the tree must be thinned out to admit sunshine and the circulation of air, and the fruit bearing area of the tree should usually be lowered.

In some cases a tree may be greatly improved by simply trimming out the dead branches. But as a rule after this has been done the head of the tree is still too thick. It must be thinned out by removing the inferior branches and those which do not go to make a good shaped head. Just what and how much to prune off is a problem that is solved only by good judgment and a great deal of experience.

Many old apple trees even after having been well thinned out, are still so tall that it is almost impossible to work in their highest branches. It is a common occurrence for a tall tree to bear its finest apples just beyond the reach of your longest ladder. So it is generally necessary to lower the fruit bearing area by cutting back the long upright branches. Much depends upon the tree and the ideal of the pruner how much to cut back the head, but as a rule it should not be left more than twenty feet high.

Because of the harm resulting from throwing the root area and the leaf area of the tree out of balance, it is better to spread this severe pruning process over two or three years, but for the sake of economy it is often done in one operation.

The best time for this pruning is in late winter or early spring. Here, as in other horticultural operations, the details are important. Branches should always be cut off as closely as possible. If stubs are left projecting, they will not heal over, but will rot back and often leave an ugly hole in the trunk of the tree. Large wounds should be painted over with pure white lead and raw linseed oil. Painting does not help to



Theron Morgan, Manager of B. J. Morgan fruit farm near Traverse City, Cherry harvest.

heal the wound, but it does preserve the exposed wood and acts as an antiseptic against rot causing fungi.

If this briefly outlined plan of pruning is properly carried out it will leave the trees in a much more sightly and convenient form to work in. With good spraying and culture it brings an orchard into a condition to bear more, larger, and better colored apples, a result well worth being sought.

AN IDEAL PEAR ORCHARD.

H. S. BIRD, LANSING.

This ideal pear orchard is situated in one of the most wonderful pear producing sections of the world. The rich clay soil, the abundant and timely rains, and the exceptional climate all play their parts. Numerous and well placed shipping stations bring the use of a good refrigerator car service close to every grower.

The ideal orchard itself consists of one hundred twenty acres of the best of this land. It is divided into six blocks, on five of which are ten year old pear trees.

As we drove between rows of perfect Bosc, Comice, and Winter Nellis trees not a single weed was visible. Weekly and often semi-weekly cultivation had discouraged even the rankest of them. Next we crossed ten acres of beautiful grounds on which were situated the buildings. Beyond these came the Anjou orchard and twenty acres of as fine Bartlett's as were ever grown.

The owner asked us to visit his fine farm residence and later introduced his foreman, a man who had spent his entire life in the pear industry. During our trip through the barns the great advantages of good machinery, thoroughly used, was explained to us. Their two spraying outfits were of the finest and best obtainable, their orchard fruit wagons were shelved and canvas covered. Nothing but spring wagons were found. shelved and canvas covered. Nothing but spring wagons were found. Three big rack wagons were ready to haul the coming crop to town.

We are next taken to the big bunk house, on the second floor of which were twenty clean comfortable bunks. The room was large, clean, and light. On the floor below were a dining room and a well equipped kitchen. From here we went to the packing shed, the entire second floor of which was piled high with boxes ready for the harvest.

I saw much of this orchard during the following weeks. At last the Bartlett's became full sized and the harvest began. The bunk house was filled with experienced men, for the consideration given them brought many applicants to choose from.

Pickers were given ten foot orchard step-ladders and picking aprons into which the pears could be placed easily and with no bruising. Only the most careful work was tolerated, yet it is surprising how little trouble there was.

Lug boxes holding about a bushel without being filled above the level of the top, had been distributed through the orchard. Into these the pears were emptied from the aprons by a method that assured no injury. The orchard wagons then transferred the fruit to the packing shed

where it was packed by experienced packers in bushel and half bushel boxes. Each pear was placed in a transparent wrapper stamped with an attractive brand. Only the most perfect fruit was packed, but in this case over ninety-seven per cent was in the best of condition.

The packed boxes were loaded in the rack wagons and within a few hours after the fruit left the trees it was tightly braced in the refrigerator cars ready for the best markets.

The natural question is, "Has all this care yielded dividends?" The answer is, "Yes, decidedly." This orchard is averaging over ten per cent clear each year. The Bartletts have never sold for less than \$1.50 per box and occasionally they have brought as high as \$5.00. The half boxes do nearly as well. Other varieties bring as much or more. In 1912 one large lot of Bosc pears sold for \$5.35 a half box.

There is no question but that all this care has yielded dividends and large ones.

REINFORCING AND BRACING FRUIT TREES.

V. R. PICKFORD, EAST LANSING.

The methods of preventing fruit trees from splitting is an important subject. We have all seen orchards of various kinds break down and become unprofitable when they should be in their period of greatest returns.

Several factors have tended to make the problem of splitting less severe. Among these is the habit of thinning, which is a widespread and growing practice, especially among peach and apple growers. The severity of the thinning should be tempered to the strength of the trees, leaving enough to make a safe load, counting on each fruit becoming normal size for the variety.

Another factor which will do away in some measure with the frequent premature breakdown is better formed trees. The idea of forming the head of an apple tree, (for example), so that the main branches are well distributed on the trunk, is a comparatively new one. Throughout the country many young orchards are found with from four to eight main branches, or scaffold limbs starting from the same level.

This summer I worked in a young Duchess orchard of considerable size in which the tops were formed in this manner. It has always had first class care, with good cultivation, making the trees of good size and thrifty appearance. Many, however, exhibit an alarming tendency to split in the crotches although up to this season they had never borne a good load of fruit.

This spring the orchard was left in clover sod, with the idea of checking growth, toughening the wood and causing them to bear. For this or other reasons they set a nice lot of fruit, making it necessary that something be done to keep the trees from splitting. In doing this a somewhat different method was followed than the usual practice of wrapping a "gunny" sack around the branches, placing a few splints over the sacking and binding them together with wire. Two inch screw-eyes were used, putting them into the frame-work branches in such a manner that the flat side of the eye was parallel with the long way of

of the branch, as this does not spread and crack the bark as much and facilitates the healing of the wound. The wire is then inserted and twisted until taut. Unless the tree has many framework branches two wires are sufficient.

The screw-eye will hold an immense weight when first put in and after remaining a season or two until the bark has had a chance to grow over them, the danger of pulling is very slight. This method is more practicable in rather small to medium sized trees. It does away with the necessity of looking after them each year, in order to see that the wire is not choking the limb it is around, besides being more quickly and easily applied and less harmful to the tree.

This particular orchard averaged two barrels of choice fruit to the tree and came through the season without the loss of a branch of any size, although dozens of them would have broken down if it had not been for the braces.

This method works equally well for peaches, but if it has been allowed to split the trunk must be bolted as well as wired. Another method worth carrying out is that of twisting the young suckers, from the different main branches about each other, making a living brace; often they will live and continue to grow as long as the tree, forming a strong brace several inches in diameter. I know of two orchards where this has been carried out very successfully.

In the case of large mature trees weakened by bearing many heavy loads of fruit, and the frosts and winds of many seasons the branches must be chained together, with props from the ground to the weakened limbs if circumstances permit.

In this work prevention of breaking and splitting should always be in mind and is much easier than mending after the damage is done.

With the main branches distributed so as to have as few weak trees as possible, and careful thinning practices, based upon the strength of the tree, followed by a good method of bracing, commencing when the trees are young thousands of trees might be saved in Michigan orchards every year. The saving in one season would be many times the cost of the labor and materials it took to safeguard them.

JUST A FARMER.

MR. GRANGER WHITNEY, WILLIAMSTON.

Just a farmer in a clearing on the bleak New England shore:
In the woods the treacherous red skin lurks and hunger shakes the door:
To the eastward lies the stormy reach of Massachusetts Bay:
To the westward through the wilderness an empire spreads away.
Who will win it from the red skin who with blindness bars the road,
For the future of humanity who will bear the heavy load?

Just a farmer.

Just a farmer following Braddock through the Pennsylvania wilds
With his knowledge and his wood lore he travels with the guides.
His uniform, a hunting shirt, his discipline, his sense.
He has neither pomp nor tactics but energy intense.

When the soldiers stubbornly went down in their hour of defeat;
Fought behind the trees and fallen logs to cover their retreat
Just a farmer.

Just a farmer riding swiftly from a furrow he has turned,
Just a farmer in whose heart the fire of patriotism burned.
The furrow turned at Danvers at the sun's first rays of light,
At noon he is at Concord and has joined the running fight
Later on he's digging trenches in the night at Bunker Hill.
In the army's front at Yorktown you will find him fighting still.
Just a farmer.

Just a farmer from the blue grass scouting southward through the wood,
With his horse and trusty rifle with an army making good.
He is following Andy Jackson and later on will fight
With grim and tried campaigners exultant in their might.
The veterans of Wellington have gathered for the fray.
On the ramparts of New Orleans, he made history that day.
Just a farmer.

Just a farmer from Virginia and another out of Maine
He still is making history in trial and in pain.
For politicians differ and reach out with graft and greed:
A nation's split asunder; for strong men there is need.
To settle claims of statehood it took many a weary day.
He fought it out: one dressed in blue, another dressed in gray.
Just a farmer.

Through the woods and cross the prairie an empire has been won.
Its boundaries see the rising and the setting of the sun.
The corn fields and the orchards all abloom stretch out to meet
The snowy tufted cotton fields, the golden fields of wheat.
Where the road bed and the train load spread their ever growing weight.
And living on the right of way the man who pays the freight.
Just a farmer.

There's a steam ship making eastward with the flower of the land,
With a freight of fame and beauty and wealth on every hand.
Historic land that's over seas will see their journeys end,
For music, art and travel their wealth they'll freely spend.
While battling with the elements, the wind, the rain, the ice,
In the clearing house of nature is the man that pays the price.
Just a farmer.

Just a farmer with his billion dollar crop of corn and wheat
With his cars of big red apples and his cargo loads of meat,
His cotton and tobacco, his sugar cane and hops.
His oats and rye and barley and his record breaking crops.
While the flower of the nation spends its holiday away.
He's wrestling from the teeming soil the wherewithal to pay.
Just a farmer.

On the seaboard there are cities whence ships go up and down.
 On the river bank and prairie is the ever growing town
 And in these urban confines there are men who strive and toil
 The sinews of the work shop are recruited from the soil.
 To the halls of legislature and the busy marts of trade
 He has sent his finest manhood that a nation might be made.
 Just a farmer.

Then pledge the nation's farmer and his sweet devoted wife.
 His husky rosy kiddies full of energy and life.
 The reserve force of the country for the battles to be won
 Is living in the open, in the wind and rain and sun.
 For scattered through the country on the plains and on the hills.
 Is the backbone of the nation the man who pays the bills.
 Just a farmer.

FRUIT PACKING LAWS.

FEDERAL APPLE LAW.

(Sulzer Bill.)

An Act To establish a standard barrel and standard grades for apples when packed in barrels, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled;

That the standard barrel for apples shall be of the following dimensions when measured without distention of its parts: Length of stave, twenty-eight and one-half inches; diameter of head, seventeen and one-eighth inches; distance between heads, twenty-six inches, circumference of bulge, sixty-four inches outside measurement, representing as nearly as possible seven thousand and fifty-six cubic inches: *Provided*, That steel barrels containing the interior dimensions provided for in this section shall be construed as a compliance therewith.

Sec. 2. That the standard grades for apples when packed in barrels which shall be shipped or delivered for shipment in interstate or foreign commerce, or which shall be sold or offered for sale within the District of Columbia or the Territories of the United States shall be as follows: Apples of one variety, which are well-grown specimens, hand picked, of good color for the variety, normal shape, practically free from insect and fungous injury, bruises, and other defects, except such as are necessarily caused in the operation of packing, or apples of one variety which are not more than ten per centum below the foregoing specifications shall be "Standard grade minimum size two and one-half inches," if the minimum size of the apples is two and one-half inches in transverse diameter; "Standard grade minimum size two and one-fourth inches," if the minimum size of the apples is two and one-fourth inches in transverse diameter; or "Standard grade minimum size two inches," if the minimum size of the apples is two inches in transverse diameter.

Sec. 3. That the barrels in which apples are packed in accordance with

the provisions of this Act may be branded in accordance with section two of this Act.

Sec. 4. That all barrels packed with apples shall be deemed to be below standard if the barrel bears any statement, design or device indicating that the barrel is a standard barrel of apples, as herein defined, and the capacity of the barrel is less than the capacity prescribed by section one of this Act, unless the barrel shall be plainly marked on end and side with words or figures showing the fractional relation which the actual capacity of the barrel bears to the capacity prescribed by section one of this Act. The marking required by this paragraph shall be in block letters of size not less than seventy-two point, one-inch gothic.

Sec. 5. That barrels packed with apples shall be deemed to be misbranded within the meaning of this Act—

First, If the barrel bears any statement, design, or device indicating that the apples contained therein are "Standard" grade and the apples when packed do not conform to the requirements prescribed by section two of this Act.

Second. If the barrel bears any statement, design, or device indicating that the apples contained therein are "Standard" grade and the barrel fails to bear also a statement of the name and variety, the name of the locality where grown, and the name of the packer or the person by whose authority the apples were packed and the barrel marked.

Sec. 6. That any person, firm or corporation, or association who shall knowingly pack or cause to be packed apples in barrels or who shall knowingly sell or offer for sale such barrels in violation of the provisions of this Act shall be liable to a penalty of one dollar and costs for each such barrel so sold or offered for sale, to be recovered at the suit of the United States in any court of the United States having jurisdiction.

Sec. 7. That this Act shall be in force and effect from and after the first day of July, nineteen hundred and thirteen.

Approved, August 3, 1912.

MICHIGAN FRUIT LAW.

(Jakway Bill.)

The People of the State of Michigan enact:

Section 1. In this Act, unless the contents otherwise requires, the term "closed package" shall be construed to mean a barrel, box, basket, carrier or crate, of which all the contents cannot readily be seen or inspected when such package is prepared for market. Fresh fruits and vegetables in baskets or boxes packed in closed crates, and packages covered with burlap, tarlatan or slat covers shall come within the meaning of the term "closed package." None of the provisions of this Act apply to other than Michigan grown fruits and vegetables.

Section 2. Every person who, by himself or by his agent or employe, packs or repacks fresh fruit or vegetables in closed packages intended for sale in the open market, shall cause the same to be marked in a plain and indelible manner as follows:

First—With his full name and address, including the name of the state where such fruit or vegetables are removed from the premises of the packer or dealer.

Second—The name and address of such packer or dealer shall be printed or stamped on said closed packages in letters not less than one-quarter inch in height.

Section 3. No person shall sell or offer, expose or have in his possession for sale, in the open market, any fresh fruits or vegetables packed in a closed package and intended for sale, unless such package is marked as is required by this Act.

Section 4. No person shall sell or offer, expose or have in his possession for sale, any fresh fruits or vegetables packed in a closed or open package upon which package is marked any designation, which represents such fruit as "No. 1," "Finest," "Best," "Extra Good," "Fancy," "Selected," "Prime," "Standard" or other superior grade or quality, unless such fruit or vegetable consists of well-grown specimens, of nearly uniform size, normal shape, good color, for the variety, and not less than 90 per cent free from injurious or disfiguring bruises, diseases, insect injuries or other defects, natural deterioration and decay in transit or storage excepted.

Section 5. No person shall sell or offer, expose or have in his possession for sale, any fresh fruits or vegetables packed in any package in which the faced or shown surface gives a false representation of the contents of such package, and it shall be considered a false representation when more than 20 per cent of such fruit or vegetables are substantially smaller in size than, or inferior in grade to, or different in variety from, the faced or shown surface of such package, natural deterioration and decay in transit, or storage excepted.

Section 6. Every person who, by himself, his agent or employe, knowingly violates any of the provisions of this Act shall for each offense, be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding \$10, or by imprisonment in the county jail for a period not exceeding thirty days, or by both such fine and imprisonment, in the discretion of the court.

THE KENT COUNTY FRUIT SECTION.

BY HON. ROBERT D. GRAHAM, GRAND RAPIDS.

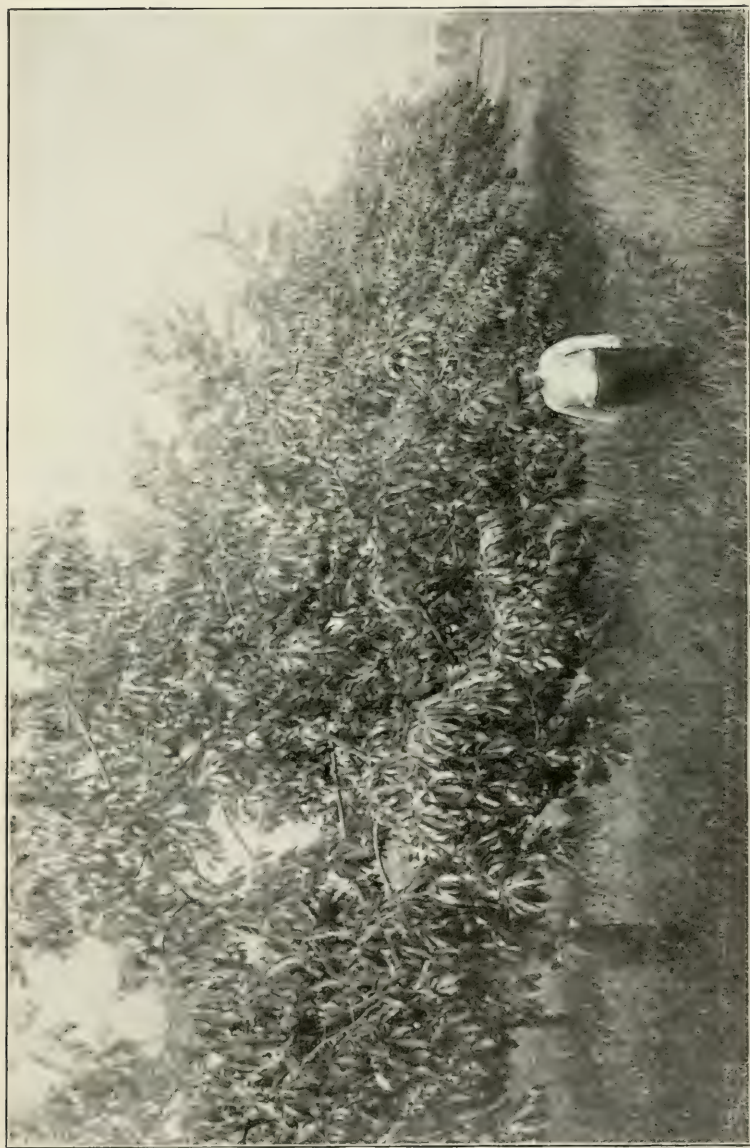
The writer came to Grand Rapids in September, 1864, and for something more than a year lived on Fountain street, just east of the present site of the Peninsular Club building. In the spring of 1866 my father purchased a small place on the hill out West Bridge street and engaged in fruit growing and marketing gardening. While not very old I was of a sufficient age to assist in the work and from that time to the present day I have been more or less actively engaged in fruit growing.

On this little farm was an orchard of apples and peaches planted by the former owner, perhaps five or six years old, standing in the sod and somewhat neglected. Fortunately, the varieties were good and after a year or two of careful cultivation this orchard proved to be a very productive and profitable investment. It contained about 200 apple trees and 400 or 500 peach trees. The market at that time was entirely local and our crop was either sold to the local grocery men or, more often, peddled from house to house. Of course, we were not the only ones grow-

ing fruit and very often the market was oversupplied and the fruit, especially peaches, went to waste. In 1874 or 1875 we shipped what I believe to be the first car of peaches that ever left this county. We loaded an ordinary box car with probably 100 bushels of Crawford peaches, setting the baskets directly upon the floor. My father took this car of fruit to Saginaw and sold them, establishing a new industry and a new market. After this nearly every year we shipped more or less fruit, both by freight and express to nearby towns and established the custom of using the bushel basket. Previous to this peaches everywhere were shipped in crates or slatted boxes. The bushel basket was for years after a distinctive Grand Rapids package. Time and again I have been on the Chicago or Milwaukee markets when the only baskets of this character were from Grand Rapids, while today half the packages used in the entire country are the standard bushel.

Along about this time it began to dawn on people's minds that fruit growing was profitable and more orchards were planted. I very well remember when in 1879 I planted my first orchard. I bought a piece of land, thirty acres, for \$4,000, just the bare land, no buildings or orchards. I paid \$1,000 down and afterwards borrowed the balance, \$3,000, of the late Isaac Phelps, paying him 10 per cent for the loan and glad to get it at that. Upon this land I planted 2,000 peach trees of various kinds. Everybody said that I was crazy and that the market would be oversupplied. All kinds of dire results were predicted. The orchard was a success, and the first two or three crops wiped out the mortgage and put some buildings on the land. Soon after this planting orchards, especially peaches, became an epidemic. Nearly every farmer in the county having anything like an elevated piece of land planted peaches. Those who did not have planted other fruits, apples, plums, grapes, or small fruit, and the farmer in this county who did not grow fruit was lonesome. Up to this time we had had no organizations; we were all amateurs; nearly everybody growing fruit treated the business as a sort of side issue. Much of our fruit was shipped out on consignment and returns were often unsatisfactory. However, this condition brought about the formation of the Grand Rapids Fruit Growers' Association, undoubtedly the largest and, I believe, the most successful organization of its kind in the country, notwithstanding the fact that it had no corporate charter or legal standing. Necessity is the mother of invention and necessity drew and held the growers together, and there grew up in Grand Rapids the largest fruit market in the world; a real market where the producer brought his produce in the morning and went home with his cash in his pocket. We brought the buyers here and they bought what their markets demanded. These were palmy days for the Kent county fruit growers, with good crops and fairly good prices.

I remember one morning when we had by actual count 120 outside buyers on the market. The climax was reached in 1902 when the following statistics as to fruit actually marketed here were taken by the Grand Rapids Board of Trade: Peaches, 1,706,000 bushels; pears, 7,400 bushels; apples, 174,000 bushels; plums, 42,650 bushels; crab apples, 2,000 bushels; quince, 1,100 bushels; cherries, 42,000 bushels; pie plant, 7,300 bushels; grapes, 125 tons; strawberries, 213,000 crates; raspberries, 92,000 crates; blackberries, 96,000 crates; gooseberries, 2,000 crates; currants, 5,400 crates. For several weeks the transportation lines devoted nearly all their men and equipment to moving the fruit crop. It



C. A. Nelson, Northport, in his "Northport Black" cherry orchard. Trees are 15 years old. Cherries are larger, firmer and better flavored than Windsor and sell at high prices.

was perishable and could not wait. After this a succession of hard winters, followed by an epidemic of fruit tree diseases and insect pests, discouraged many growers. Orchards were neglected and soon fell a prey to their enemies and were soon destroyed and removed, and today one may see bare and in many cases badly gullied and washed fields where once grew fine productive orchards. The farmers, however, who stuck to the business, giving their orchards proper care, have found them increasingly profitable.

There is no good reason why Kent county should not be producing more fruit today than ever before. It is true conditions have changed. The fruit grower of today must be a specialist. Fruit cannot be grown in the old careless manner; indeed, I doubt whether the general farmer from now on will be able to produce fruit for home consumption. It is a serious question if he can afford to do so. It is a business by itself and gradually we must grow up a new generation of men who will be primarily fruit growers and not farmers, and when that time comes Kent county will again take its rightful place as the banner fruit section. Our splendid market, excellence and diversity of soils, elevation, immunity from frosts, all combine to make this the ideal location if we but meet the changed conditions. I know of no more pleasant and profitable occupation or one that will more surely and quickly respond to intelligent effort.

We hear a great deal said about over-production. We have always had the same talk, but the facts are that when production reaches a point at or above local consumption and an outside market must be obtained, the greater the supply the greater the opportunity to interest the buyers; in fact, until we can furnish solid cars and in large quantities, we cannot expect to command any considerable outside trade. Buyers will go where there is an adequate supply.

ESSENTIALS IN PEACH PRODUCTION.

GENERAL REQUIREMENTS FOR SUCCESSFUL PEACH PRODUCTION.

BY F. M. BARDEN AND H. J. EUSTACE.

Before anyone engages in commercial fruit growing, he should not only make a careful survey of the possibilities from the financial stand point, but also consider his personal desires and inclinations to grow fruit. With these points in view, it is hoped that this chapter may be of some value, to the prospective peach grower.

Attitude toward Fruit Growing.—Fruit growing in Michigan is passing through a great awakening. From the southern to the northern part of the lower peninsula, old orchard ground is being refitted, new land is being cleared, and most of the desirable sites now cleared, are being sought after. The purpose of all of this activity is to set out fruit trees. Apple trees are being planted more than any other kinds of fruit, and peaches are a close second. Since they are not adapted to so wide a range of conditions as the apple, there is some danger that peach orchards may be set where the local conditions are not altogether favorable.

It is needless to state that the cause of this activity is due almost entirely to the profits many of the Michigan growers have been realizing from their crops in the past few years. An individual's attitude toward a business is probably too often governed by the prospects of the money to be gained in its pursuit. The thought of personal fitness is very frequently kept in the background until the condition of the business requires that it be exercised. The way in which thousands of persons have rushed into peach growing in Michigan at various times in the past half century, may be well compared to the similar rushes that multitudes have made into newly discovered gold fields. The results have been quite identical. No one should start commercial fruit growing with the idea that money is to be easily gathered from an orchard. Correct principles rightly followed will bring results; but it requires a genuine love for the business that knows no faltering, to live up to the principles. The personal equation is of great importance in the work. Discouragements are sure to come and the grower must have a vision, faith, and enthusiasm that will force him onward. His personal supervision is generally necessary, and he must not shrink from taking an active part in any of the operations.

Because of her natural conditions, Michigan has possibilities for fruit growing that are not exceeded by any of the states, and equalled by few, if any. These conditions consist of: sites, soils, temperatures, transportation facilities by water and rail, and a short distance from some of the largest markets in this country. If these advantages are properly combined and used, coupled with hard work and the application of correct fundamental principles, success is sure to follow.

Region.—The western coast of Michigan has been called "The Peach Belt," due to the temperature modifying effects of Lake Michigan, for

it was discovered as early as the beginning of the nineteenth century, that peaches could be successfully grown in this region. But there are some regions in the interior of the state where this fruit has been grown successfully for many years in succession. Many orchards have been planted in regions where the trees would grow well for several years; then an unusually severe winter has wiped out the work of the preceding years before there has been sufficient remuneration to repay expense. Again, a success may be made of keeping the trees, but frosts at blossoming time cut off so many crops, that a profit is not realized. These occurrences cause so great a hazard, that one would be wise to go slowly in a new and untried region.

The prospective peach grower had better be sure of starting in a region favorable from the weather standpoint, unless a special market, location, or something of that kind counterbalances all extra risk. Other things that seem to differ with various regions are; susceptibility to disease and insects, variation of varieties, opportunity to obtain sufficient labor, and the marketing conditions. These fundamental matters should be inquired into before selecting a permanent location for peach culture, or before one who is already located upon a farm assumes the risk attending the planting of a large peach orchard.

Sites and Soils.—The region or section having been decided upon, the next important question is the choice of a site that promises to be especially favorable for a peach orchard. Many mistakes have been made by people who have assumed that because there are several successful peach growers in a region, that any site in that neighborhood is favorable and when planted with peach trees, will produce large crops of fine fruit. Nothing could be more incorrect or misleading. The most famous peach producing sections have sites that are highly profitable, but in these same regions, much of the land is no better for peach growing than it would be anywhere else in the state.

Elevation and slope mean success to a very large extent in the peach business. It is a fact well established in "The Peach Belt" that the direction of slope really counts for little in assuring a crop of fruit nearly every year; but a slope in some direction is quite essential, as air drainage must be secured. Often a difference of several days in the blossoming time is seen in orchards on adjoining farms, due, almost entirely, to the direction in slope. That this would mean much in many parts of the state is very evident, but under the influence of Lake Michigan, it seems to count for little. The slope toward the south, of course, is the earliest, while the one toward the north is the latest and this same relation prevails throughout the season. A steep slope is not as desirable as one more gradual, due to serious soil washing, harder work in spraying, cultivation, and other orchard operations.

Successful peach orchards are to be found upon nearly all types of Michigan soils. Profitable crops may be grown upon the lightest sand and the heaviest clay, each soil producing a characteristic type and quality of fruit. To say that any particular type of soil would be the most profitable for a peach orchard, is impossible. Some growers have success upon many types of soil by handling them skillfully. Personal preference must be a deciding factor, but most growers desire a soil of a sandy nature and it is a fact that the majority of favorable sites have this type of soil. There are many cases where the light sand soils,

so commonly found along the shores of Lake Michigan, when properly handled, have proven very satisfactory for peaches. Many orchards on these kinds of soil have produced very successful crops. But the plant food in soils of this type is soon exhausted and the neglect to turn anything back into them has made it very difficult to start another orchard upon the same site. On some of these sites, it might be profitable to spend money to restore the fertility so that another peach orchard could be successfully raised on the same site, but unless the location is unusually favorable, many things should be thoroughly considered before making the outlay. Such lands should be purchased at a low price as considerable money may be needed to build up the soil. Probably the most ideal soil is the gravelly, sandy loam that is rich in organic material.

Distance from Shipping Station.—The kind of roads is one of the great determining factors in considering the distance from the shipping station. It is certainly desirable, under all conditions, to locate in a section where there will be a short haul, as at the best, this is an expensive part of the business. Yet, in so many instances, the very best sites are found at a considerable distance from a shipping point, and the advantages of a good site and soil thus gained, will offset many times the extra expense of hauling. The distance over which the fruit must be hauled by wagon is certain to have an ultimate effect upon its keeping quality. No fixed rules can be made as to the relative values of certain distances, so many factors must be considered, but the judgment of the individual is to make the final choice and this decision should be arrived at, only after considering all the conditions, including the mode of shipping. It is generally better to locate where water and rail compete.

Consideration For Other Crops Grown Upon The Farm.—There are few farms in Michigan where all of the area is adapted for raising peaches. On nearly every farm, there is likely to be some land too low to be desirable. Even if this were not so, it is a question whether one would be justified in devoting all of his land to one crop that is subject to so many risks. There is an advantage in having land to which profitable attention can be given when the orchard does not demand it. Thus a grower will be able to raise at least a part of the necessary feeds for the farm animals. Some growers may desire to produce other kinds of fruits, and many farms are particularly adapted to other fruits. There may also be an advantage in carrying on a side line, as dairying. But the best care of the peach orchard must not be sacrificed for "side lines." This is just where many have made failures in the past. The peach not only demands, but in a good location, is worthy of the best efforts and when not so treated, it fails to respond with profitable crops of fruit. If conditions are such as to warrant the planting of a peach orchard, it must be made a main part of the business and not a side issue in order to bring the best results.

Risks to be Considered.—It has already been hinted that there are several risks attending the business of producing peaches. While hundreds of growers consider these of small importance in comparison with the results it is possible to secure, still it is well to have them in mind.

A study of the history of the peach business of Michigan shows that the first enemy of the trees which confronted the grower was a

disease. This trouble now called the "Yellows" was supposed to have been imported from an eastern state and from the first year it became known, has made severe inroads in many orchards. Because of the mysteriousness of this disease it has been a continual menace to peach growers in many sections of the state. Another one equally mysterious has appeared in recent years, known as "Little Peach." The lack of knowledge concerning the exact nature and workings of these diseases and their behavior in the past has discouraged many former growers from planting a new orchard. Spending several years in growing an orchard and then seeing it destroyed by these diseases, is an experience that is discouraging, and to be feared in the future. There are localities in which these diseases have occurred and been checked and practically eradicated, which indicates that under correct methods of peach orchard management, they should not be considered as dangers too great to be risked. There are other diseases and several insect pests that may be found in many peach orchards, but they are comparatively easy to control and are hardly to be considered as risks.

There is another risk with which every peach grower is acquainted and that is the weather. A year never passes without more or less anxiety being experienced by the owners of peach orchards over the condition of the fruit buds, but some years it includes the life of the trees. Of course, the risk varies with the location, site, and variety, but there seems to be no place where one can feel sure of complete safety, as the weather may do the unexpected. Such was the October freeze of 1906 which extended over the southern part of the Michigan "Peach Belt," making practically a clean sweep of all the orchards. But these occurrences are rare. Doubtless, hundreds of growers are willing to testify that the losses due to winter killing of buds and trees have not been so serious or extensive but that the profits from the crops greatly exceed those of any other kind of farming which they might have entered. Too great risks have been taken by planting orchards in unfavorable locations and results have been disastrous. It is to be hoped that the present and future grower may profit by the experiences of the past.

Another thing which, by many, is considered a risk, is overproduction. This was uppermost in many minds a decade or so ago, but the prevalence of diseases, variations in temperatures, and the combination of conditions that tend to make the peach trees short lived, as managed by many growers, have proven that overproduction is hardly to be expected. The years are few in which conditions are such as to produce a full crop of peaches in every section of the United States where they are grown, and the man who is so located as to be reasonably sure of a crop about every year, should be able to withstand a low price when these rare years do come.

Still another risk to be thought of, and one that increases every year, is that of labor. It means a great loss for a grower to produce a crop and then to be unable to secure enough help for the harvest. The scarcity of labor varies with regions and should be thought of when selecting a section for growing any kind of fruit, but as the peach harvest must be rushed, it is more imperative with this than most other fruits.

GROWING THE PEACH ORCHARD.

The principles outlined in the following pages are based upon the experiences of the senior author and his father in producing peaches in Michigan through a combined period of thirty years. While these principles have proven successful with the conditions experienced by these individuals, several things might require changing in order to suit the circumstances of other growers. It is desirable, therefore, that a brief description of site and soil of the orchards should be given, that methods may be more clearly understood.

Site and Soil.—This subject and the following one can best be described by referring to a fifteen acre peach orchard owned by the senior author. The land slopes toward the south and west and for the greater part is gradual. Excellent air drainage is afforded by reason of the



AN ELEVATION IS DESIRABLE.

A peach orchard in Grand Traverse County. Fruit buds on the trees in region of X are frequently destroyed by late frosts, while those on trees in region of O are not injured.

surrounding regions being lower on all sides. There is some variation in the soil, a portion of the higher elevation is clay, but nearly all of the land is a gravelly, sandy loam. In some parts, a clay subsoil is found, but over a large part, the subsoil is sand. The soil requires no tile and is well adapted to growing the usual farm crops of which it has produced profitable yields.

Previous Condition of the Land.—This land was originally covered with hardwood trees, mostly beech and maple. Since being cleared, it has raised general farm crops and a portion of the present orchard is the third bearing peach orchard upon the same land. Some stable manure has been added at various times and cover crops have been used quite extensively. It has not always seemed to be advisable to reset a piece of land immediately after removing an old peach orchard,

as the new trees do much better after the land has produced other crops for two or three years. If the grower, however, is very anxious to replace an orchard, as was the case with many after the freeze of 1906, it certainly is worth the attempt. Under such circumstances, it may be advisable to spend considerable money in order to gain a year or possibly two, to secure a bearing orchard.

Preparation of the Land for Orchard.—The peach tree, when given an opportunity, is a vigorous grower and a heavy feeder. Thus, every effort should be made to provide as favorable soil for the orchard as possible. One of the best plans is to secure a good clover sod upon the land intended for the orchard site and if possible, cover this with stable manure. This treatment should assure an ideal physical condition of the soil for the orchard and also for any crop that may be grown between the young trees. If there is a desire to save a year of waiting, it may be advisable to plow five or six furrows through the field of young clover. The trees are planted in this strip and may be easily cultivated during the first year while the space between the rows is saved to produce a better sod. Upon the lighter soils, winter vetch promises to be a valuable plant to produce a crop to be plowed under before planting to trees. In general, every effort should be made to utilize material that will add humus to the soil, as most of the favorable peach sites are lacking in this material at the present time.

In case there are any wet spots in the field, they should be thoroughly tile drained. Peach trees will not survive long in wet places. The land should be plowed and fitted the same as if it were to be planted to corn, as the peach tree demands the most favorable conditions for root growth.

Varieties.—In the choice of varieties, the prospective grower should be governed by several conditions such as: the market with which he expects to deal, the orchard site, size of the orchard, ability to secure labor, and the efficiency of handling facilities. Many markets discriminate against the white varieties and have certain varieties which they especially prefer. Nearly all agree that the white varieties are the more resistant to cold and diseases; but if one is to be handicapped in marketing, there is not much encouragement in planting them. The Michigan grower must compete in the same markets with southern grown peaches. Hence there is not much profit in planting the earlier varieties; as they ripen at the same time with the best of the southern grown fruit. When the competing crop is light, these varieties are profitable, but when it is heavy, they will barely pay the expense of handling.

A peach grower of some experience can, by a study of the orchard site, be able to place trees of certain varieties where they will succeed the best in relation to the soil and elevation. For example, the Gold Drop and Lemon Free are very hardy and if a portion of the land is so situated as to be possibly liable to frost injury, such varieties should be set in these places. On the other hand, the Elberta is more tender and should be favored with the best location. A study of the description of varieties and a comparison with the prospective site should enable the prospective grower, even a beginner, to place them intelligently.

There are many orchards in this state in which the varieties are so badly mixed and scattered that it is almost impossible to harvest

all of the crop at the proper time. Such conditions add greatly to the expense of harvesting, as well as inconvenience of the owner. This occurrence may be due to the trees being untrue to name or because of neglect to secure the correct number of trees of a certain variety to make complete rows and subsequent indifference or carelessness in replanting.

If a grower is planning a small orchard and desires to do most of the work without extra help, he should make use of several varieties of different ripening periods. Or, if it is expected to supply a local market, it will be found an advantage to have many varieties to secure a long season of ripe fruit. But if the owner is to dispose of his crop in a distant market, he should concentrate upon a few leading commercial sorts, planting extensively enough, if possible, to ship in carload lots. Such an undertaking will require considerable help and the best facilities, but it is worthy of the effort.

The leading commercial variety at present is the Elberta. This is due to several desirable characteristics such as: the uniformly large size of the fruit, its tough structure, which makes possible long shipments, the early age at which the trees bear, and the relatively small amount of work required to produce the fruit. The tree does not require so much pruning or thinning as many other varieties, the fruit is very easy to handle and the market price is usually the highest. However, it is not a good policy to depend upon one variety entirely. Following a severe winter, a grower may discover that the Elberta buds are all dead, while the more hardy varieties may have enough live buds to produce a crop.

There is and always will be a difference of opinion as to the best commercial varieties, but the following list has given good results in Michigan;* New Prolific, Engle, Elberta, Kalamazoo, Gold Drop, Banner, Lemon Free, Smock and Salway. In general, these are given in their order of ripening, but there is so much variation and overlapping that this order will not apply under all conditions or in every season. Some varieties may be profitable for one grower, while for another with different soil and care, they may be of little value. Thousands of dollars have been wasted by the poor choice of varieties for particular sites and one should study the question thoroughly before deciding definitely.

Securing Trees.—It is not the purpose of this bulletin to direct an individual where to purchase trees. There are many good nursery companies and the best of them are liable to mistakes. One should deal with a company that has a reputation for honest methods and thus eliminate many possibilities of a loss.

Many growers prefer to obtain their trees in the fall and heel them in for the winter; others allow the nurseries to winter the trees in storage cellars, shipping them in the spring. The cellar stored tree, not having been subjected to the vigorous winter cold, comes out in good condition with strong buds and, if properly handled under favorable weather conditions, will make a quick, vigorous growth. But there have been warm springs when it has been necessary for the nurserymen to remove the trees and ship early to avoid too great a development of

*For further information about varieties, the reader is referred to Michigan Agricultural Experiment Station Bulletin No. 262. This will be sent free upon request.



N. B. Hayes of Muir set 40 acres of Northern Spy apple trees when he was 52 years old. He is now 77 and is enjoying the fruits of his faith and energy.



A number of prominent Grand Rapids horticulturists, including Messrs. Braman, Cook, Wilde, Munson, Berkey, Garfield, Brown and Udell.

the buds. The trees have then been heeled in lightly by the purchaser and, before planted, a change in the weather with a drop in the temperature has been sufficient to so weaken the tree as to prevent its vigorous growth when planted. Such experiences have caused large losses under such conditions and while the nurserymen may replace the trees, they do not repay for the loss in time of one year.

The class of trees an individual selects is quite largely a matter of



FIG. 1. PEACH ORCHARD PLANTED TOO CLOSE ONE WAY.

A common mistake is made in planting peach trees too close. In this orchard, cultivation and spraying can be done in but one direction.

Fig. 1. A row looking north.

Fig. 2. A row looking south.

personal preference, but it is always well to select a perfect specimen with respect to the root system and the body. It is shortsightedness to plant inferior trees.

Planting the Trees.—Probably one of the most convenient methods of laying out the ordinary orchard and locating the places for the trees is by use of a horse and marker. By cross marking, the intersection of the marks become the location for the tree. It is a pleasure to see

a perfect alignment of trees in all directions, but slight differences will disappear before the orchard is very old.

There is a tendency among growers to extend the distances between the trees. This is due to the change from high to low headed trees, the necessity of spraying, the more general practice of thinning and an increased knowledge on the part of the growers that the tree makes use of the soil from a wide surrounding area. A soil washout in the



FIG. 2.

orchard will show that the root system extends several feet beyond the ends of the lower branches. It is not advisable to plant closer than twenty feet in each direction and upon soils that will produce a large growth, twenty-four to twenty-five feet is much better and on good soil, some vigorous growing varieties are set twenty-eight feet apart.

Most growers prefer to dig a large hole, loosen the soil in the bottom and plant the tree a little deeper than it grew in the nursery, preferably so the point of insertion of the bud will be covered. The tree should be slightly inclined toward the direction from which the prevailing wind blows. This in the lake region, is southwest. The top soil

should be worked in around the roots in order to secure a good contact. If the soil is not in good state of fertility, it would be well to use some rich garden or virgin soil for a great deal depends upon the trees getting a good start. Such treatment is especially beneficial on old orchard land that may be susceptible to the root aphid as the root systems must be vigorous to overcome this pest.

The trees are handled much easier and cheaper if they are pruned before planting. This consists in trimming off any broken roots, clipping off all twigs close to the trunk so as to form a whip, and then cutting it back to a height varying from 18-30 inches from the ground. This height depends upon the preference of the grower. Care should always be taken to prevent the roots from drying and it is generally best to keep them in water just before planting.

Care During the First Three Seasons.—The treatment of the land during the first year will depend upon the crop that the owner may desire to produce. Corn is usually preferred and is satisfactory where the land is adapted to this crop. It should be grown in hills and plenty of space left next to the trees. In a twenty foot planting, four rows may be run in each direction and in the twenty-four foot space, there is an opportunity for five rows. The cultivation of the corn assures proper tillage for the young trees.

Corn is not the only crop that may be grown during the first year. Beans, potatoes, and truck crops are frequently grown. While it is possible and often practical to secure something from the land during the growing period of the trees, one must always remember that the growth of the orchard is the main object, and all the crops grown among the trees should be considered as side issues. A hoe should be used around the tree occasionally to conserve the moisture for the roots. When hoeing, it is convenient to train the head of the tree by rubbing off the young shoots that may start in undesirable places. The growth of the tree is thus confined to the parts that will be left in future years. All weeds should be kept down, especially around the trees. At the time of the last cultivation, a cover crop should be sown. The kind will depend upon the condition of the soil and the preference of the grower. If more nitrogen is desired, winter vetch or one of the clovers should be used. If the purpose of the crop is simply to conserve plant foods and to secure a covering for winter and spring, rye is very satisfactory. This applies especially to the first year, as one is reasonably sure to plow early the second year, thus keeping ahead of the growth of rye. In autumn, after the foliage drops, soil should be mounded around the trunks of the young trees, using care to fill any hollows or depressions that surface water may drain away. This mound will also be valuable in preventing the mice from nesting in any grass that may be next to the tree. This practice should be followed every year while the tree is young.

In the early spring of the second year, the orchard should be pruned. From three to five main limbs should be left well distributed in all directions and so arranged that chances for poor crotches will be eliminated. These limbs must be cut back severely, leaving not more than one-third of the growth of the previous season. Before the buds start, the trees should be sprayed to prevent the leaf curl disease. If the land is in good condition, it may be cropped during the second season and

should be plowed and fitted early. Corn is frequently grown the second season in peach orchards, but the trees must be given plenty of room. The care during the remainder of this season is practically the same as the preceding one.

Pruning at the beginning of the third year consists of thinning out the top to produce an open center and cutting back at least one half of the growth of the previous season. The whole tree should be studied in heading back. The side opposite the one from the prevailing wind, usually the east, will grow much more rapidly than the



PRUNING YOUNG PEACH TREES.

Elberta tree before and after pruning.

other and it should, therefore, be cut back very severely in order to keep the growth and shape of the trees well balanced. In a general way, the care during the third year is very similar to that of the first two seasons. Where the land is sufficiently rich in plant foods, it is a common practice to raise a crop among the trees again. Beans are often preferred at this time. They do not shade the trees, neither do they require as much moisture as corn. In a favorable year, the trees of some varieties will produce a few fruits during the third season, but if the trees have been properly pruned, there should be only a few.

Growing the Fruit.—The fourth year should mark the period when

it might reasonably be expected that the orchard should come into bearing. Some varieties, under favorable conditions, may produce a good crop the fourth season, but it is not wise to allow heavy bearing at any time and more especially during the first few years.



PRUNING BEARING PEACH TREES.

A five year old Elberta tree before and a similar tree after pruning. Ingham county.

Pruning.—The trees will produce a large number of fruit buds and the owner must act judiciously with the pruning shears. Too many growers hesitate to prune peach trees enough, but permit them to carry a vast amount of surplus wood. As a result, there is overbearing and the usual results, a weakened condition of the tree, increased suscep-

ibility to diseases and low temperatures, inferior fruits, and a shorter-lived tree. Profit from peaches does not come by having a large crop every alternate year, with nothing the other years, but the endeavor should be to produce a good crop of fine fruit every year. The method of pruning counts for a great deal in securing this result. The best time to do the pruning is early in the spring after the danger from winter injury has passed and before the leaves appear.

The system of pruning will vary with ideas of the grower, but the purpose should be to keep the top open, spreading and low. An open top will permit the sunlight to give high color to the fruit, and help to produce fruiting wood low down in the tree. A spreading top is obtained by cutting off the leaders just above a side branch which is growing toward the outside of the tree, or, in case of the absence of the branch, just above an outside bud. This form of a head is the natural consequence of cutting back and thinning out and gives a large amount of bearing area close to the ground. The necessity for spraying is reason enough for a low headed tree, but it has another decided advantage when the fruit is thinned or picked. Also, according to investigations carried on among peach growers of New York and Michigan by U. P. Hedrick of the New York Agricultural Experiment Station* a low headed peach tree is more hardy and vigorous than one with a high head.

Many growers do not cut out any of the small twigs in pruning, but this makes a very easy way of thinning the crop. In young bearing trees, it is quite a safe rule to clip off every alternate twig. Unless the buds are killed to a very large extent, the fruit will require a heavy thinning after this. Any rule of this kind must be suited to conditions, as pruning should vary with the characteristics of the tree, variety and season. Judgment is a large factor in pruning and this will be developed very largely by experience.

Spraying.—It is now a common practice for the best growers to spray the trees for leaf curl. Until the advent of the San Jose scale, copper sulphate solution was the spraying solution for this disease, and is used to some extent today where the scale is not present, but wherever the scale is found or suspected, the lime-sulphur wash is applied while the trees are dormant and destroys the San Jose scale and prevents the leaf curl disease. Full descriptions of these preparations are to be found in the bulletin on spraying† and it is enough to state here that if the work is done thoroughly, and at the proper time, good results will surely follow.

The summer spraying of the peach in Michigan has not as yet been practiced to a very large extent, due probably to several reasons. The Brown Rot (*Sclerotinia fructigena*) (more apparent on the fruit about ripening time, but often destructive to the blossoms) is not thought to be often seriously destructive to many of the varieties commercially grown in the state. The preparation and labor of spraying with the self-boiled lime-sulphur mixture is, by many growers, considered very irksome. However, the results of many careful experiments and the

*Fifty-fifth Annual Report of The Western New York Horticultural Society; Notes on the Peach. By U. P. Hedrick; 1910, p. 26.

†Sent upon request to the Michigan Agricultural Experiment Station.



WELL PRUNED.

An Elberta tree 16 years old. Oceana county. Skillful pruning has kept this tree low. Easy to spray, thin and pick.



POORLY PRUNED.

Tree has formed a bad crotch and poor pruning has permitted an unnecessarily high fruiting surface.

returns secured by growers who have practiced summer spraying, prove that it is a very paying orchard operation. Not only can the fruit rot be largely controlled, but also the black spots or peach scab (*Cladosporium carpophilum*) which gives the fruit an unattractive appearance and by adding poison, the curculio can be killed. Further, sprayed peaches have been noticed to be of a very much superior color than fruit from orchards that were not sprayed, besides keeping much better after reaching the market.

Cultivation of the Bearing Orchard.—Peach orchards are always cultivated. Apples and pears may, under certain conditions, be successfully grown without soil cultivation, but this cannot be done with peaches.

The cultivation may be done by discing or plowing. There are successful advocates of both systems. Discing does not injure the tree roots as does plowing and it can be done easily and cheaply. On the other hand, it must be started early in the spring, before weeds or grass get a start, as they cannot be worked into the soil with a disc if they are very large. For the same reason, cultivation must be frequent to keep the orchard clean.

The great necessity of starting this work early in the Spring may, in some years, interfere with the pruning and other farm operations.

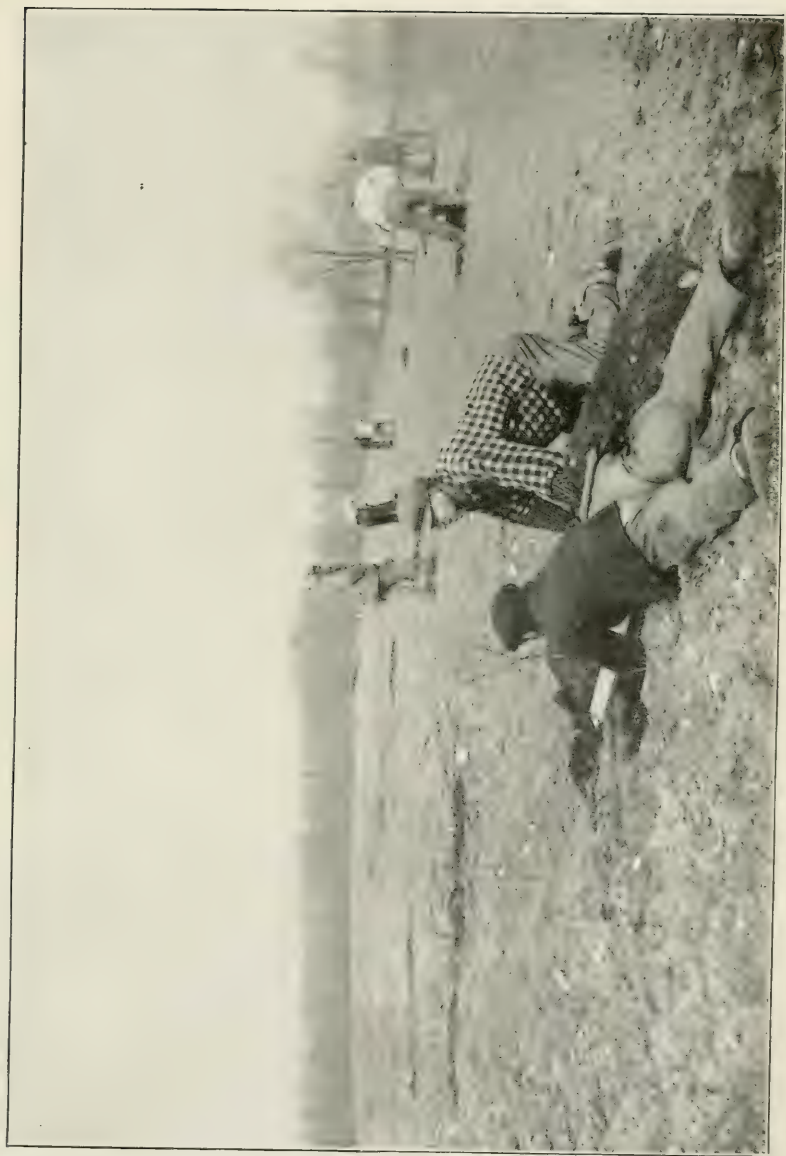
Cover crop* plants that live over winter, such as the clovers, rye or winter vetch, of course, cannot be used, but plants like buckwheat and oats and peas that are killed by the cold, must be used as the remains of them can be worked into the soil.

When the practice has been to disc the orchard, the system should not be changed. With orchards that are plowed, the time for doing the work is not as exacting as with discing. It may be varied with the season, the kind of cover crop used and the pressure of other work. The cover crop, if it is one that grows in the spring, should be allowed to attain a good size, but plowing should never be delayed until the growing cover crop draws too heavily upon the soil moisture. Ordinarily, the plowing is not started until the fruit has set, the latter part of May or the first of June. A heavy rainfall, which in many years occurs about this time, is a great help on most soils. One horse on a light plow with offset is used to turn the first three furrows next to the trees. The remainder of the space can be easily plowed with a team. Usually, the furrows are turned toward the trees for two succeeding years, then away one year, thus keeping the land as nearly level as practicable. Immediately following the plowing, the soil should be worked down to conserve the moisture, following the same methods as in other farm operations to secure similar results. There are various types of extension tools upon the market that will cultivate close to the trees without crowding the horses under the limbs.

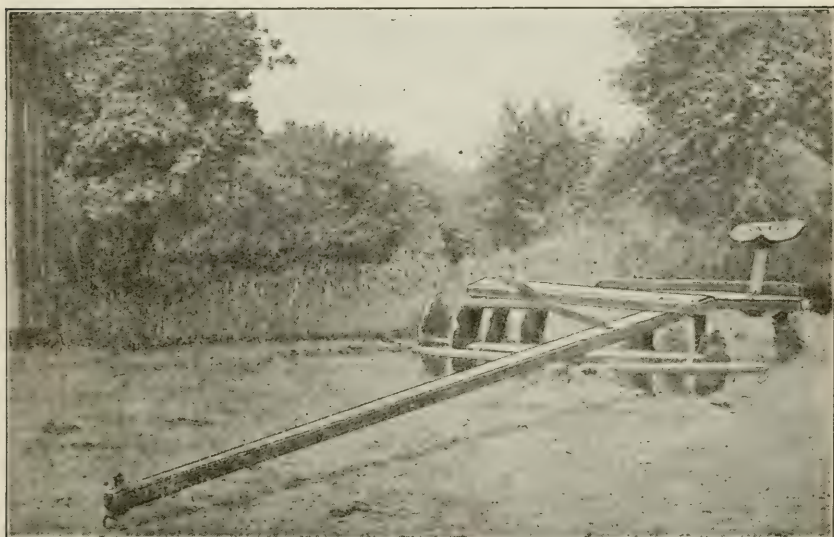
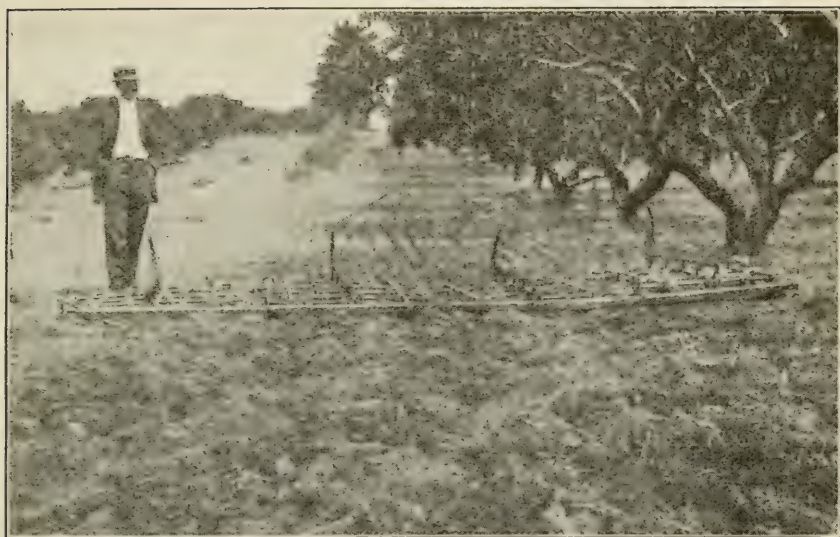
The frequency of cultivation will depend upon the moisture conditions of the soil, but will average about once a week. The object should be to maintain a fine dust mulch until the last of July or the first of August, depending upon the season. The cover crop seeds are sown at the time of the last cultivation.

*Further information on cover crops is given in Mich. Agr. Exp. Station Special Bulletin No. 18.

"Cover Crops for Michigan Orchards and Vineyards." It will be sent upon request.



Setting trees for the 200 acre Montmorency Cherry Orchard of Dane & Boughey, Northport.



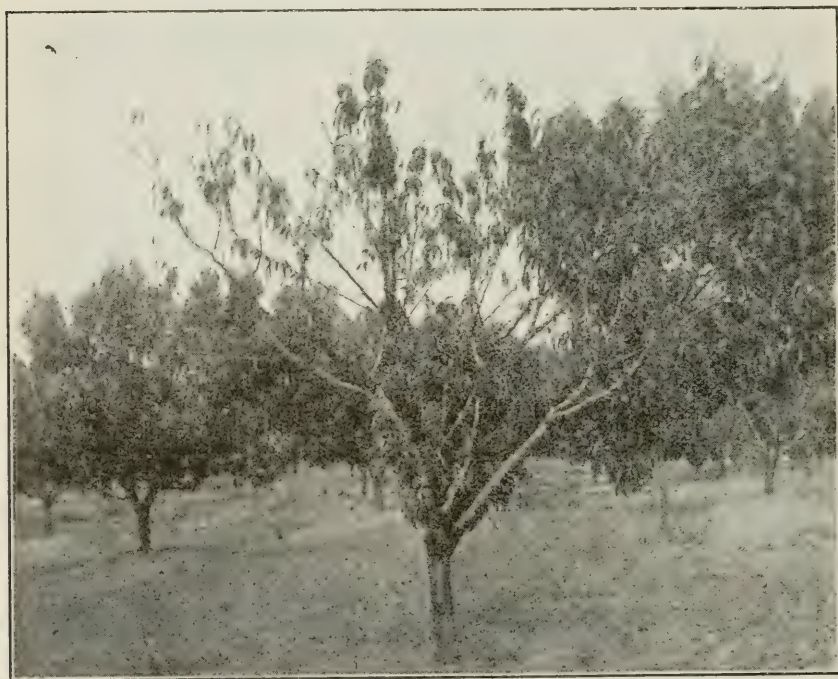
CULTIVATION TOOLS.

Upper: Two spike tooth harrows fastened together will extend under the low headed trees. Handles are bent so do not hit low limbs.

Lower: A side draft cutaway harrow for cultivating along the tree row under the trees, an excellent tool but the side draft is hard on the team.

Care should be exercised to avoid hitting the trunks of the trees with the harrows, as injuries thus produced are very detrimental to the future of the orchard.

Thinning.—When the general or as it is sometimes called, “June” drop of the peaches is over so that it is possible to determine which are to be the permanent fruits, it is time to start the work of thinning. This is usually the latter part of June. The varieties should be thinned in the order of their ripening. The main points to be considered in the operation are the characteristics of the variety; and the peculiarities of season. Various rules are sometimes given as to the distance apart



WINTER INJURY.

A three year old peach tree injured by winter freezing. In an exposed part of the orchard where the snow was blown away and the soil froze deeply. Oceana county.

to leave the fruits, but they should be regarded as very elastic. Varieties that are inclined to bear heavily and that ordinarily produce small fruit must be thinned severely. If a tree has one part full and the other part light, the heavier portion may be thinned less than it would be if the whole tree were full. Trees that are for any reason regarded as “weak” should not be allowed to bear heavily. If a tree has been well pruned, the fruits may be left nearer together upon the twigs than would be permissible with poor pruning. It must be remembered that the production of peach pulp does not draw heavily upon the tree, but it is the formation of pits and seeds that taxes the vitality. Hence, the

most pulp that can be produced per tree with the smallest number of pits possible will not only give better fruits for the market, but will prove the most economical for the tree. Care should be taken in thinning to remove all of the inferior or injured specimens, as there is no profit in producing peaches for the pigs. The earlier the thinning is done after it can be determined which are the permanent fruits, the better will be the results. The size of the remaining fruits will be increased when the thinning is done late, but it will be of far less benefit to the tree.

HANDLING THE CROP.

Picking.—A knowledge of the right time to pick peaches must come very largely by experience. Most varieties are so sensitive that they must be picked at a certain stage or there will be a loss from over-ripeness. If a grower has a large number of trees of one variety, he must be prepared with sufficient help and equipment to meet the rush of work that a change of weather might mean. Slow ripening is desired as it not only allows more time in which to do the harvesting with the smallest amount of waste, but also allows the fruit to become fully developed. Generally, it is necessary to go over the trees three times in order to gather all of the fruit, but with cool weather, some varieties may require four or five pickings. On the other hand, hot weather will reduce the number to two and sometimes to one. Ordinarily, the trees require picking over about every alternate day, but this is variable. For shipping to distant points, the fruit must be picked when firm, but should have its full size and be colored as much as possible.

Careful handling is absolutely necessary to avoid bruising and this carefulness must start with the pickers. The fruit is hauled to the packing shed upon a low orchard wagon that is made for this special purpose.

Packing.—Packing houses should be arranged with the idea of efficiency. There should be plenty of room, but not so large as to cause unnecessary steps. Where the fruit is to be sized with a mechanical sizer, the machine should be placed near the door. The peaches may thus pass directly over the machine and be poured upon the sorting table, from which they are placed in packages for shipment. The whole idea should be to work the fruit from the receiving door to the place of loading on to the wagon with the greatest ease and haste and smallest expense.

Many styles of packages for peaches are upon the market, but the kinds most used are: bushel basket, Georgia carrier or six basket crate; one-half bushel basket, and one-fifth bushel. A few years ago, the last named was largely used as practically the whole crop was, at that time, packed in small baskets, but the market demand has changed and the bulk of the crop is now handled in a larger package, although much of the early fruit is still shipped in the small baskets. The Georgia carrier, or six basket crate is extensively used by some growers. When first used for Michigan fruit, they were sold at very fancy prices, as only the highest grade fruit was shipped in them. But the high price encouraged some growers to abuse the package by filling them with a smaller grade of fruit and thus, their value has been seriously reduced. Unless an extra good price can be secured for fruit packed in these carriers, it

is doubtful if their use would be enough more profitable than the bushel baskets. The one-half bushel basket is intended for a fancy package, but has also been abused. These packages should be used only for the largest and finest fruit, then they would retain their individuality.

At the present time, the bushel basket is used more than any other package, largely because of the ease in handling and the profit that generally results. The future usefulness of the package depends upon the honesty of the packers to keep the fruit in the bottom equal to that on the top. In some cases, the fruit in these packages is packed



PEACHES PACKED IN GEORGIA CARRIERS.

Left: Packed on diagonal, much preferred by some dealers.
Right: Packed flat and tight, fruit often bruised.

solid from the bottom to the top, but generally, they are filled loosely, well shaken down, then smoothly faced.

In using any style of package, the endeavor should be to make it look attractive and in this effort, the fruit must be of equal size and quality throughout the package.

Marketing.—The marketing and financial end of the peach growing business is the one of greatest importance. It is possible to make a splendid success of the peach business to the producing point and then have a complete failure when it comes to marketing the crop. Some fruit sections are favored with good canneries where the entire crops of many growers may be sold. In such cases, the fruit is delivered in bushel crates and much riper fruit may be included than it is possible

to ship to distant markets. There is, therefore, a saving of labor, basket expense, and worry.

The growers who are located near the large markets are enabled to sell their produce direct to the consumer. This is a great advantage and generally adds considerably to the profits. At a certain well known shipping point, it is the custom for outside buyers to come in and buy directly from the growers. They sometimes purchase an entire crop before the harvest begins, but more often, they buy as the crop is harvested. It is very satisfactory to sell the whole crop in advance, as in handling so perishable a fruit, it is a great relief for the grower to know just where to place the shipment of each day, and exactly the amount to be received. The market is sure to have off days and the one who can sell for a fixed price for the season, even though it seems low when compared with certain high sales, is more sure of a profitable season.

Some growers are successful in maintaining an order trade and disposing of a large part of their fruit at a good price, but the perishable character of the peach keeps many from entering this field.

Probably, the most of the peach growers must depend upon consigning the fruit to a distant market and usually this is quite undesirable. Yet, the grower who will put up an honest package with an attractive label and ship to one market can create a good demand for any uniform type of fruit. The unsatisfactory marketing conditions should lead growers to form effective co-operative associations that would be able to seek the best markets and thus return larger net profits. Judging from the past experiences, it is doubtful if the peach business will ever reach a point where a good, well located orchard, well cared for will not yield a good profit; but undoubtedly, there will be some years when only the most effective methods in marketing will bring satisfactory results.

FINANCIAL STATEMENT OF A 15 ACRE PEACH ORCHARD.

This orchard is located in Allegan County, Ganges Township, eight miles northeast of the City of South Haven, Michigan. The site, soil, and previous crops on the land, were discussed on page 9. It was planted in the spring of 1907. The October freeze of 1906 had killed practically all of the peach trees in the region including the trees upon this particular site. Although this had been the second orchard of bearing age upon this site, the location had proven so good that steps were immediately taken to plant another.

The best of good fortune did not attend the orchard during the first year. It was necessary to replant over 100 trees the next year. This was chiefly due to two causes: first, the trees were delivered during a few days of warm weather early in the spring with the buds very much advanced and a period of cold weather following weakened the trees; second, a portion of the site is on a side hill that had been somewhat depleted by soil washing and was not in the best of condition for starting young trees. This hill side has been the unfavorable part of the orchard until the present time.

On the other hand, a block of over four hundred trees have made such an exceptional growth and borne fruit so well that the orchard, as a whole, will compare favorably with the majority of the best orchards in the peach section. The varieties and number were as follows: New

Prolific, 100; Engel, 350; Kalamazoo, 200; Gold Drop, 120; Elberta, 125; Banner, 100; Fitzgerald, 100; Smock, 250, and Salway, 200. Here again the orchard is typical of the majority as 120 supposed to be Smock, proved to be Champion, and nearly all ordered for Banner are unknowns.

The trees are twenty feet apart each way, but at least a portion of the orchard should have been planted twenty-four feet, as the tips of the limbs touched when the trees were only four years old.

A crop of corn was grown between the trees the year they were set. The orchard land was not cropped after this first year, because there was so much other land on the farm to attend to at planting time and also, it was thought best to give the orchard every opportunity possible. If some crop had been grown during the second season, the total profit from the land up to this time might have shown a considerable increase.

A complete cost account of the first three years was not kept, but it has been carefully estimated by keeping a strict account upon younger orchards that are growing beside this one. For the past three seasons, a complete record of every hour devoted to the orchard has been strictly recorded. All manual labor, except pruning, has been charged at fifteen cents per hour. As pruning is considered a higher class of work than the other operations, it has been charged at twenty cents per hour. Horse work is charged at the rate of fifteen cents per hour for a team. For hauling to market, a flat rate of two dollars per trip has been charged. In computing the cost per acre of each item, it has been based upon the total acreage of the orchard, thus with some of the items, it does not give the true cost per acre for the operation, as the whole area was not included in performing the work. Illustrations of this would be the application of manure or some of the cover crop seeds. However, the general operations apply to the whole orchard, thus the cost per acre as computed, would be correct. The results for the six years are given in the following tables:

COST ACCOUNT OF A FIFTEEN ACRE PEACH ORCHARD.—1907, FIRST YEAR.

Operation.	Total Hours.		Total Cost.	Hours per Acre.		Cost per Acre.
	Man.	Horse.		Man.	Horse.	
Plowing.....	70	140	\$21 00	4.66	9.33	\$1 40
Fitting.....	45	90	13 50	3.00	6.00	90
Marking.....	15	15	3 38	1.00	1.00	22
Trees, 1590 at 7c.....			111 30			7 42
Digging holes.....	40		6 00	2.66		40
Planting trees.....	100	50	18 75	6.66	3.33	1 25
Cultivating.....	30	60	9 00	2.00	4.00	60
Marking for corn.....	15	15	3 38	1.00	1.00	22
Planting corn.....	30		4 50	2.00		30
Seed, 2 bushels, at \$1.00.....			2 00			13
Cultivating, 2 horse.....	80	160	24 00	5.33	10.66	1 60
Cultivating, 1 horse.....	60	60	13 50	4.00	4.00	90
Hoeing.....	20		3 00	1.33		20
Rye, 15 bushels, at 75c.....			11 25			75
Sowing rye.....	10		1 50	.66		10
Cutting corn.....	100		15 00	6.66		1 00
Husking and crib.....	240		50 00	16.00		3 33
Hauling fodder.....	40	20	9 00	2.66	1.33	60
Equipment charge.....			5 00			33
Interest on land.....			90 00			6 00
Totals.....	895	610	\$415 06	59.62	40.65	\$27 65

INCOME FROM FIELD.

600 bushels of corn at 75c.....	\$450 00
2,380 bundles of fodder at 2½c.....	59 50
Total income.....	\$509 50
Total cost.....	415 06
Net profit.....	\$94 44

Aside from the first cost of the trees and work of planting them, the first year includes but little more effort than that necessary to produce a corn crop. Not quite so much corn can be grown as in the open field on account of the interference of the tree rows.

1908.—SECOND YEAR.

Item.	Total Hours.		Total Cost.	Hours per Acre.		Cost per Acre.
	Man.	Horse.		Man.	Horse.	
Manure, 30 loads.....			\$30 00			\$2 00
Hauling.....	30	60	9 00	2.00	4.00	60
Lime-sulphur, 200 gal.....			2 50			16
Applying.....	10	10	2 75	.66	.66	18
Planting 110 trees.....	10		1 50	.66		10
Pruning.....	20		4 00	1.33		28
Plowing, 1 horse.....	20	20	4 50	1.33	1.33	30
Plowing, 2 horse.....	40	80	12 00	2.66	5.33	80
Harrowing.....	170	340	51 00	11.33	22.66	3 40
Hoing.....	40		6 00	2.66		40
Oats, 15 bushels at 40c.....			6 00			40
Drilling oats.....	10	20	3 00	.33	.66	20
Equipment charge.....			3 00			20
Interest on land.....			90 00			6 00
Totals.....	350	530	\$225 25	22.96	34.64	\$15 00
Total cost.....						\$225 25
Cost per acre.....						15 00

The manure used in this case was well rotted and was applied around the young trees during the winter. No charge is made for the trees in this table as they were furnished by the nursery to replant where those of the previous season had failed to grow.

1909.—THIRD YEAR.

Item.	Total Hours.		Total Cost.	Hours per Acre.		Cost per Acre.
	Man.	Horse.		Man.	Horse.	
Lime-sulphur, 400 gal.....			\$5 00			\$ 33
Applying.....	16	8	3 60	1.06	.53	24
Trees, 50 at 7c.....			3 50			23
Planting trees.....	5		75	.33		05
Pruning.....	70		14 00	4.66		93
Plowing, 1 horse.....	30	30	6 75	2.00	2.00	45
Plowing, 2 horse.....	40	80	12 00	2.66	5.33	80
Harrowing.....	170	340	51 00	11.23	22.66	3 40
Hoing.....	40		6 00	2.66		40
Oats, 15 bushels at 40c.....			6 00			40
Drilling oats.....	10	20	3 00	.33	.66	20
Equipment charge.....			3 00			20
Interest on land.....			90 00			6 00
Totals.....	381	478	\$204 60	24.93	31.18	\$13 63
Rebate from Nursery.....			\$65 00	Per acre.....		\$4 33
Total cost.....			\$139 60	Cost per acre...		\$9 30

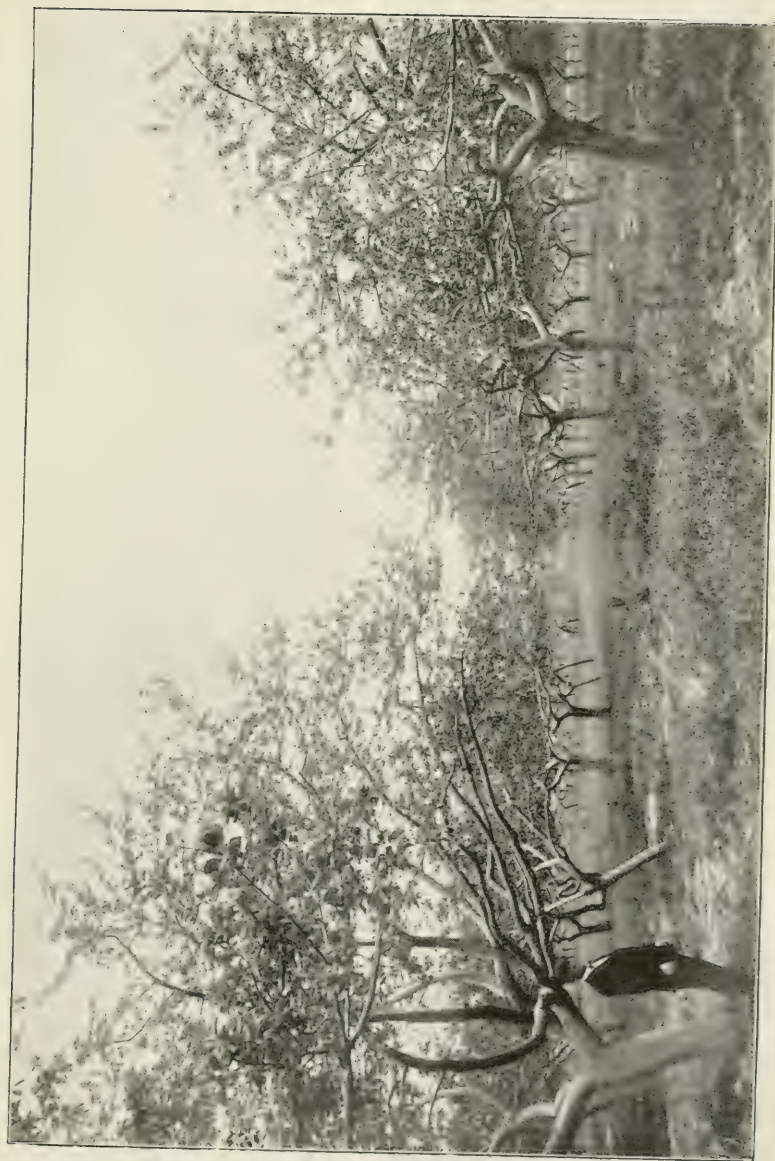
The rebate from the nursery as mentioned in this case was received for trees that were untrue to name. This emphasizes the necessity of dealing with a nursery company that will endeavor to make up for mistakes.

It will be noticed by studying the cover crops used that no attempt was made to supply nitrogen. This was due to the fact that the majority of the orchard was growing too fast for safety and it was not thought wise to add anything to augment it.

1910.—FOURTH YEAR.

Item.	Total Hours.		Total Cost.	Hours per Acre.		Cost per Acre.
	Man.	Horse.		Man.	Horse.	
Lime-sulphur, 700 gal.....			\$8 75			\$ 58
Applying.....	23	23	6 17	1.53	1.53	41
Pruning.....	211		42 20	14.06		2 81
Raking brush.....	23.5		2 78	1.53		18
Hauling brush.....	16	16	3 82	1.06	1.06	25
Trees, 16 at 7c.....			1 12			07
Planting trees.....			30			02
Manure, 5 loads.....			5 00			33
Applying.....	13.5	27	4 05	.90	1.80	27
Plowing, 1 horse.....	29	29	6 52	1.93	1.93	43
Plowing, 2 horse.....	37.5	75	11 25	2.50	5.00	75
Hoing.....	31		4 65	2.06		31
Harrowing.....	85	170	25 50	5.66	11.33	1 70
Applying ashes.....	4	2	75	.26	.13	05
Wiring trees.....	40		6 00	2.66		40
Material for same.....			1 50			10
Oats, 10 bushels at 40c.....			4 00			26
Drilling oats.....	6	12	1 80	.40	.80	12
Sowing other cover crop.....	6		90	.40		06
Surgical.....	26.5		3 97	1.76		26
Knocking snow.....	15		2 25	1.00		15
Equipment charge.....			5 00			33
Interest on land.....			90 00			6 00
Totals.....	569	354	\$238 28	37.71	23.58	\$15 84
Total cost.....						\$238 28
Cost per acre.....						\$15 84

The orchard would undoubtedly have yielded a splendid crop the fourth season as it gave every indication of so doing but unseasonable cold weather at the blossoming period proved too much for the young trees. A few unhealthy appearing trees were removed during the season. Cover crop seeds for about seven acres were furnished for an experiment both for the fourth and fifth seasons. In the autumn, while the foliage was still upon the trees, there was a heavy fall of snow that resulted in completely destroying some of the best trees and split many more clear to the ground. These were wired and bolted and have borne two crops of fruit.



Orchard on the Glen Haven farm of President D. H. Day of the West Michigan Development Bureau.

1911.—FIFTH YEAR.

Item.	Total Hours.		Total Cost.	Hours per Acre.		Cost per Acre.
	Man.	Horse.		Man.	Horse.	
Lime-sulphur, 1,275 gal.....			\$15 43			\$1 03
Applying.....	40	40	9 00	2.66	2.66	60
Trees, 50 at 10c.....			5 00			33
Planting same.....	5		75	.33		05
Pruning.....	333		66 00	22.20		4 44
Raking brush.....	28		4 20	1.86		28
Hauling brush.....	28	28	6 30	1.86	1.86	42
Plowing, 1 horse.....	34	34	7 65	2.26	2.26	51
Plowing, 2 horse.....	39	78	11 70	2.60	5.20	78
Hoeing.....	26		3 90	1.73		26
Harrowing.....	102	204	30 60	6.80	13.60	2 04
Self-boiled L-S 440 gal.....			2 10			14
Applying same.....	9	18	2 70	.60	1.20	18
Wiring trees.....	20		3 00	1.33		20
Thinning.....	155		23 25	10.33		1 55
Sowing cover crop.....	16		2 40	1.06		16
Oats, 6 bushels at 50c.....			3 00			20
Winter vetch, 120 lbs.....			12 60			84
Picking.....	549		82 35	36.60		5 49
Trucking.....	126	126	28 35	8.40	8.40	1 89
Packing.....	437		65 55	29.13		4 37
Hauling, 34 trips.....			68 00			4 53
Packages.....			223 60			14 90
Equipment charge.....			5 00			33
Interest on land.....			90 00			6 00
Totals.....	1,947	528	\$773 03	129.75	35.18	\$51 52

Received for 2,039 bushels of peaches at \$1.25.....	\$2,548 75
Received for 25 bushels of peaches at 50c.....	12 50
Total.....	\$2,561 25
Total cost.....	773 03
Net profit.....	\$1,788 22
Net profit per acre.....	119 21
Cost per bushel 37c, net profit per bushel.....	.86+

It will be noticed that the price of trees advanced this season. The self-boiled lime-sulphur spray was applied to only a small part of the orchard. The price received for the fruit was net at the shipping station. Returns from the first crop are much more than sufficient to offset all previous expense.

1912.—SIXTH YEAR.

Item.	Total Hours.		Total Cost.	Hours per Acre.		Cost per Acre.
	Man.	Horse.		Man.	Horse.	
Lime-sulphur, 1,475 gal.....			\$18 44			\$1 23
Applying same.....	40	40	9 00	2.66	2.66	60
Trees, 16 at 10c.....			1 60			10
Planting same.....	4		60	.26		04
Pruning.....	367		73 40	24.46		4 89
Raking brush.....	45		6 75	3.00		45
Hauling brush.....	20	20	9 00	1.33	1.33	60
Manure, 12 loads.....			18 00			1 20
Applying same.....	10	30	3 75	.66	2.00	25
Plowing, 1 horse.....	33	33	7 42	2.20	2.20	49
Plowing, 2 horse.....	38	76	11 40	2.53	5.06	76
Harrowing.....	114	228	34.20	7.60	15.20	2 28
Hoeling.....	34		5 10	2.26		34
Sowing cover crop.....	10		1 50	.66		10
Oats, 12 bushels at 40c.....			4 80			32
Clover, 1 bushel at \$1.00.....			4 00			26
Thinning.....	113		16 95	7.53		1 13
Picking.....	567		85 05	37.80		5 67
Trucking.....	164	164	36 90	10.93	10.93	2 46
Packing.....	397		59 55	26.46		3 97
Hauling, 33 trips.....			66 00			4 40
Packages.....			264 43			17 62
Equipment charge.....			5 00			33
Interest on land.....			90 00			6 00
Totals.....	1,956	591	\$832 84	130.34	39.38	\$55 49

Received from 2,128 bushels of peaches.....	\$2,920 99
Total cost.....	832 84
Net profit.....	\$2,088 15
Net profit per acre.....	139 21
Average price received per bushel.....	\$1 38
Cost per bushel.....	40
Net profit per bushel.....	\$ 98

Although the farm thermometer registered twenty degrees below zero during the winter of 1911-12 and some apparently healthy trees were killed yet the orchard yielded more fruit than it did the previous season. The crop was borne on about two-thirds of the orchard as the lowest and highest parts received the greatest amount of injury. By comparing the amount of time devoted to pruning this season with that of the preceding year, it is noticeable that the work was just as thorough this year as last and the yield of fruit showed its worth.

The expenses were higher for the year than any previous season but the returns were very satisfactory. Considerable reduction is noticeable in the amount of time required to pack the fruit. This is largely due to the difference in size and quality of the peaches. The last season, no grading was required as all was packed as one grade.

The clover mentioned in the table was common red clover seed that was screened out by the fanning mill and was sown very thick over a portion of the orchard that requires more vegetable matter.

In the following table a summary for the entire period is given in order to provide an easy comparison of the results.

SUMMARY FOR SIX YEARS.—15 ACRES.

Year.	Crop.	Total income.	Total cost	Income per acre.	Cost per acre.	Total loss.	Total profit.
1907.....	Corn.....	\$509 50	\$415 06	\$33 96	\$27 67	\$94 44
1908.....			225 25		15 00	\$225 25
1909.....		65 00	204 60	4 33	13 64	139 60
1910.....			238 28		15 88	238 28
1911.....	Peach.....	2,561 25	773 03	170 75	51 52	1,788 22
1912.....	Peach.....	2,920 99	832 84	194 74	55 52	2,088 15
Totals.....		\$6,056 74	\$2,689 06	\$403 78	\$179 23	\$603 13	\$3,970 81

Net profit on field for six years.....	\$3,367 68
Average annual profit.....	561 28
Average annual profit per acre.....	37 41
Total yield of peaches.....	4,192 bu.
Average price obtained per bushel.....	\$1 31
Total cost for six years, excluding cost of corn crop and deducting rebate from nursery company.....	2,395 08
Average cost per bushel as obtained from total cost.....	57
Average net profit per bushel.....	74

A certain over-head charge should be made to provide for the orchard's share in the farm buildings, also to cover the necessary expense of clearing the land in case of another general freeze but either of these is difficult to estimate at present.

The orchard is now a commonly called six year old, and with good care and no bad luck is just entering into the period of greatest usefulness. Some of the trees will be short lived due to the effects of the snow storm during its fourth year and there will be some vacancies to fill at the beginning of the seventh year but as a whole, it is in very good condition.

GENERAL TREATMENT FOR SPRAYING APPLE ORCHARDS.

In the winter or early spring, inspect the trees for San Jose, scurfy or oyster-shell scale. (Send twigs and strips of bark to the entomologist of the Experiment Station, if you cannot identify the scale yourself.)

These scale insects, especially the San Jose scale, must be destroyed promptly or they will kill the trees.

JUST BEFORE THE BUDS OPEN, if the scale be present, spray with the *strong* lime-sulphur wash. To be successful, the work must be done very thoroughly—this means that *every part* of the tree must be covered with the spray.

JUST BEFORE THE BLOSSOMS OPEN, OR WHEN THEY ARE "IN THE PINK," a spraying must be made to prevent scab and other fungus disease and the canker-worm, bud-moth and a few other insects. For this and the sprayings that follow, use the dilute lime-sulphur or the bordeaux mixture. To every fifty gallons, add two or three lbs. of arsenate of lead. (With lime-sulphur, this is the only poison that can be used.)

IMMEDIATELY AFTER THE BLOSSOMS FALL, and before the calyx closes, another spraying must be made just like the one before. At this time direct the spray downward from above as much as possible, and with the highest pressure available, the object being to get some of the material into the calyx cups, to poison the larva of the codling moth when it attempts to enter.

This is a very necessary spraying. If well done it usually means a crop free from worms.

ABOUT TWO WEEKS AFTER THE ABOVE SPRAYING, make another. Use same mixture and poison as in previous spraying.

EARLY IN AUGUST, there will be a second generation of codling-moths. Just when this will occur for your locality can be determined. (See "When the codling-moth flies" page 127.)

Protect fall and winter varieties against the codling-moth and a possible late outbreak of scab. Use the usual amount of poison, but the *dilute* lime-sulphur, or the bordeaux, either of which can be made somewhat weaker than before.

THE LESSER APPLE-WORM, which works more superficially than the codling-moth, when present requires a spray of poison when standard winter varieties are from 1 to 1½ inches in diameter.

PLANT LICE of several kinds infest the apple tree, and their effect on the fruit and foliage depends largely on weather conditions.

The lice are hatched out by the time the buds turn pink and a spray of nicotine or some other contact spray is most effective at that time.

On the other hand, an early Spring with warm, dry weather following this time is unfavorable to the lice and they may fail to appear in large numbers during such seasons. Cold and wet and a late Spring are favorable to the rosy lice. In seasons of this character, spraying is almost imperative.

The spray to use is one that kills by contact. Nicotine is best of all but expensive; *strong* tobacco tea will also produce results. For further information, see page 119.

FIRE BLIGHT has been very serious in apple trees in some parts of the State during the past few years.

For description and method of control see "TREATMENT FOR PEARS" on page 112.

GENERAL TREATMENT FOR SPRAYING PEACH ORCHARDS.

Inspect for scale insects, the same as for apple, and spray with *strong* lime-sulphur wash the same as directed for apple trees.

If this spraying is made, it will also prevent the leaf-curl disease. If the lime-sulphur spraying is not required, a spraying must be made to prevent the leaf curl which is often especially serious on Elbertas. For this spraying, use bordeaux mixture or the copper sulphate solution (2 pounds of copper sulphate dissolved in fifty gallons of water). It is very important that this spraying be made *before* the buds swell. If made after that time, it will not be successful in preventing the leaf curl.

If the fruit in your orchard is commonly affected with the rot and the scab (the small black specks usually on the upperside) and the curculio ("the insect that stings the fruit")—and most of the peach orchards in Michigan are affected with all of these—make sprayings as follows:

JUST AFTER THE BLOSSOMS DROP AND MOST OF THE "SHUCKS" HAVE FALLEN OFF, spray with poison, using 2 pounds of arsenate of lead in every 50 gallons of water.

(See under arsenate of lead page 124.)

Never use any arsenical other than arsenate of lead, on peach.

TWO WEEKS AFTER THE PREVIOUS SPRAYING, another must be made. This time use the self-boiled lime-sulphur and to every 50 gallons add 2 pounds of arsenate of lead. The *dilute* lime-sulphur has not been generally satisfactory on peaches. Even when *very dilute* some burning of the foliage has resulted.

ABOUT ONE MONTH BEFORE THE FRUIT RIPENS, spray again the same as directed above.

In orchards where the curculio is not present or not serious, the spraying recommended "Just after the blossoms fall" can be omitted.

Self-boiled lime-sulphur settles rapidly, so keep well agitated and do not add the arsenate of lead until just before spraying. Use fine nozzles and give the trees a uniform coating of mist-like spray.

PEACH TREE BORER. Dig out by hand early in spring or late in fall at points where gumming shows. Sterilize knife with carbolic acid to prevent spreading crown-gall which may be present.

"PEACH YELLOWS" AND "LITTLE PEACH."

These two diseases are extremely infectious and very difficult to positively identify. Their causes are unknown and the only method of control is destruction of the tree—fruit, root and branch—as soon as

discovered. It is especially important that diseased trees should not be allowed to blossom as it is believed the disease is spread by insects at that time. Both old and young trees of all varieties of peaches and probably all varieties of Japanese plums are susceptible to the two diseases. Both diseases may be present in a tree at the same time.

PEACH YELLOWS. The first symptoms in a young tree, previous to bearing, are indicated by the leaves of one or two limbs turning from a rich dark green to a "yellowish green or reddish rusty green" color; this is accompanied by a rolling of the leaves from their edges. These



PEACH YELLOWS.

A six year old peach tree in an advanced stage of the "Yellows."

leaves ripen and fall earlier than normal leaves. The fruit buds are larger and more mature in appearance and in the spring will invariably bloom earlier than healthy buds. In some instances, the symptoms are not confined to one or two branches, but many of the leaves in the center of the tree turn yellowish or light green, roll slightly from their edges and droop considerably. These latter symptoms are often present in case of "Little Peach."

Upon bearing trees, there may be any one or all of the following symptoms: the fruit may ripen prematurely—one to three weeks—upon one or two branches or over the entire tree. The fruit may have numerous red spots on the surface, the spots sometimes extending in red streaks partially or wholly through the flesh to the pit. Often the flesh, about

the pit, is full of radiating streaks of red. The surface of the fruit may be smooth or considerably roughened and the flesh more or less stringy and very insipid. The leaves may be yellowish pale or reddish rusty-green in color, usually rolling and drooping. In advanced stages, numerous finely branched shoots bearing many slender sickly leaves,



CUTTING OUT BLIGHT.

Cutting out blight in a quince tree. The blight attacks pears, apples and quinces. Note the bottle containing the disinfecting material, and the sponge to apply same.

appear on the trunk or main limbs and sometimes in the extremities of the branches. *Finally the tree dies.*

Winter injury to the bark of the trunk or main limbs, mechanical injury by mice, rabbits, peach borers, cultivators, etc., or a serious lack of moisture or nitrogen in the soil may discolor the foliage and cause premature ripening of fruit and should not be mistaken for "Yellows."

LITTLE PEACH. In "Little Peach," characteristic symptoms are: the leaves of a part or the whole of the tree have a bunched appearance, and are shorter, and broader than normal leaves. They are usually yellowish-green in color with the veins appearing dilated and darker than the intervening tissue. The fruit is usually under size and ripens from a week to two weeks late. The flesh is more or less stringy, watery and very insipid while the pit is usually very small. One or all symptoms may be present and unless they can be positively attributed to some other cause, the tree should be condemned, pulled out and burned.

GENERAL TREATMENT FOR PEAR ORCHARDS.

Inspect for scale insects and if present, spray before the buds start with *strong lime-sulphur*. The *Pear Blister Mite* (a mite that causes thickened red and brown spots on the leaves) and the *Pear Psylla* may also be partially controlled by this spraying for scale. If these pests were serious last year, make the strong lime-sulphur spraying even if not needed for the San Jose scale.

APPLY THE SAME GENERAL TREATMENT TO PEARS as is given for apples. If the *dilute* lime-sulphur is used, it should not be as strong as for apples (see dilution table on page 128).

PEAR BLIGHT OR FIRE BLIGHT was very serious last season in many parts of the state. It is easily noticed, a branch dies back from the tip, leaves turn brown, wither, but do not drop. Is caused by a germ that works within the twig and hence spraying is not a preventative. It usually is more serious in rapidly growing trees and for this reason, many pear orchards are left in sod. Cut out the diseased twigs and branches. Make a frequent and systematic inspection of every tree and cut out every diseased twig and branch found. Cut several inches below where the wood appears to be dead. Carry the dead portion out of the orchard and bury or burn. After every cut, wipe off the wound with a cloth or sponge moistened with a 5% carbolic acid solution.

If slugs appear, spray with an arsenical, if not too near ripening of fruit to be dangerous. In case of early pears *fresh* hydrated lime may be dusted on.



English Morello sour Cherry tree, loaded with fruit, on B. J. Morgan (estate) farm, Leelanau county.

GENERAL TREATMENT FOR PLUMS.

Plum trees may be infested with the San Jose or by the European fruit scale. The treatment for them is the same as recommended for scale on apples. (Page 108.)

JUST BEFORE THE BUDS OPEN, spray with the *dilute* lime sulphur (or the bordeaux mixture) and arsenate of lead, $2\frac{1}{2}$ to 3 lbs. to a barrel. This is to prevent leaf-spot, fruit rot, black knot and curculio.

Arsenate of lead is preferable to paris-green on all stone fruits, owing to tenderness of foliage in such fruits.

IMMEDIATELY AFTER THE BLOSSOMS FALL, it is very essential to make another spraying using the *dilute* lime-sulphur or bordeaux mixture or *self-boiled* lime-sulphur, and two pounds of arsenate of lead to every 50 gallons. (For the Japanese varieties use the self-boiled lime-sulphur or dilute the bordeaux one-half.) This spraying is to prevent the leaf diseases, fruit rot and curculio. Be sure it is made *immediately* after blossoms fall. Our experiments last year showed that dilute lime-sulphur was very satisfactory on plums and it is easier to prepare and spray than bordeaux or *self-boiled* lime-sulphur.

TEN DAYS OR TWO WEEKS LATER, it will pay to repeat the previous spraying, especially if the weather is wet or the curculio is serious. This spraying should be repeated every ten days or two weeks until there is danger of staining the fruit; stopping at least a month before picking time.

On varieties especially susceptible to rot, an application of weak copper sulphate may be made about two weeks before ripening. One pound of copper sulphate to 150-200 gallons of water. No poison need be used.

BLACK KNOT. Early in the spring a careful inspection should be made of every tree, and *all* "black knots" cut out and destroyed. Cut back several inches below the knot. Disinfecting cuts as for pear blight is not necessary. Wild cherry trees harbor the disease and if diseased ones are near plum or cherry orchards, they should be destroyed, if possible.

GENERAL TREATMENT FOR CHERRIES.

Cherry trees may be infested with San Jose scale. If found, the treatment is the same as that recommended for the apple.

JUST BEFORE THE BLOSSOMS OPEN, spray with dilute lime-sulphur, or bordeaux mixture. This is to prevent the rot and leaf spot troubles. Especially valuable on the English Morellos for the latter. Our experiments the last two seasons indicate that the dilute lime-sulphur is just as satisfactory as the bordeaux for cherries and either is better than the self-boiled lime-sulphur.

JUST AFTER THE BLOSSOMS FALL, make a spraying like the above with the addition of 2 pounds of arsenate of lead to every 50 gallons of spray solution. This spraying is directed against the rot and leaf spot, curculio and slug.

TEN DAYS OR TWO WEEKS LATER, it may be necessary to make another spraying like the previous one for the rot and leaf spot. The need for this spraying will depend upon the susceptibility of the variety to the rot and to the weather conditions of the season.

LARGE BLACK LICE may appear on the leaves at any time. A spraying of tobacco water (see page 126) will destroy them if applied before the leaves curl too tightly.

SLUGS sometimes appear after the fruit is harvested, a spraying of arsenate of lead (2 or 3 pounds in 50 gallons of water) will destroy them.

GENERAL TREATMENT FOR GRAPES.

Grape vines are not often subject to attacks by scale insects so there is seldom need for a spraying with *strong* lime-sulphur before growth starts.

Do not use the *dilute* lime-sulphur at any time for grape spraying. It stunts or checks the growth of the berries. Use the bordeaux mixture.

DOWNY MILDEW commonly called "Red Grape" was very destructive last season and caused large financial losses to growers who did not spray.

BLACK ROT has been a serious disease in recent seasons. Growers cannot afford to risk the loss it may cause by neglecting to spray.

These diseases and others will be prevented very largely by spraying as follows:

WHEN THE SHOOTS ARE ABOUT 8 TO 10 INCHES LONG, spray with bordeaux mixture for black rot and downy mildew.

JUST BEFORE BLOOMING spray again with bordeaux mixture for black rot and downy mildew and to every 50 gallons of bordeaux, add 2 or 3 pounds of arsenate of lead to poison the grape berry moth, and the rose-chaffer. If this latter is serious use stronger poison even up to 5 lbs. to 50 gallons. A pint of the cheapest molasses added may help.

JUST AS THE BLOSSOMS ARE FALLING, make another spraying like the above.

ABOUT 10 DAYS OR TWO WEEKS LATER, it may be necessary to make another spraying like the two previous, but this will depend upon the weather conditions and the amount of rot and mildew prevalent. If later sprayings are thought to be necessary, some material should be used that will not stain the fruit such as weak copper sulphate solution. (See page 124.)

There are several grape insects that are found only in occasional vineyards, and then not every year. The grower should keep a sharp watch of his vines for them and if found, take prompt measures to destroy them. (If not familiar with their appearance send specimens to The Entomologist, East Lansing, Michigan.)

Those most likely to be found are the following:

FLEA-BEETLES may appear at any time but are most likely to come as the buds open in early spring. Spray with bordeaux mixture and a strong poison, 3 or 4 pounds of arsenate of lead to every fifty gallons of the bordeaux, if early in spring. Later use less poison.

In vineyards where the grape-berry moth is serious, spray with bordeaux and an arsenical poison during the middle of July, before the 20th.

For leaf-hoppers, sometimes incorrectly called "Thrip," spray with nicotine or with kerosene-emulsion while the insects are young, and before they can fly. Later in the fall, clean up all rubbish and burn after cold weather sets in.

For climbing cut-worms, use cotton bands or bands of sticky mixture. On tender growth these can be put on strips of paper.

GENERAL TREATMENT FOR CURRANTS AND GOOSEBERRIES.

San Jose and European fruit scale are often found upon these bushes. Inspect carefully for them. If found, spray before growth starts with *strong* lime-sulphur.

JUST AS THE LEAVES ARE EXPANDING, spray with *dilute* lime-sulphur or bordeaux and two pounds of arsenate of lead to every fifty gallons.

REPEAT this spraying when the fruit is about one-fourth grown.

If worms trouble after this, use pyrethrum or hellebore.

Leaf bugs or aphids may appear. When they do, spray with nicotine or strong tobacco water while the bugs are red and wingless and before the leaves have become curled.

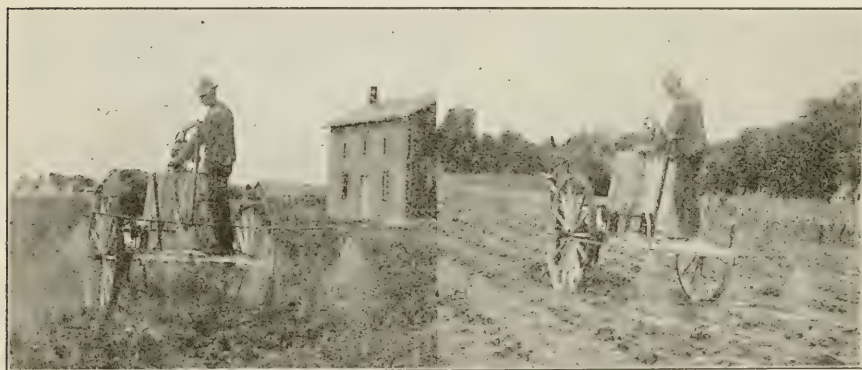
GOOSEBERRY MILDEW is a fungous disease that is especially troublesome on the English varieties as Industry, Columbus and Chautauqua. Spray

with dilute lime-sulphur. Begin when the buds start and repeat every 10 days to two weeks until near picking time.

WHEN PRUNING, if a cane is cut that shows discolored pith, it may indicate the cane borer. Cut back to sound pith. Burn trimmings.

WILTED FOLIAGE at any time indicates the cane borer. Cut out and burn.

GENERAL TREATMENT FOR RASPBERRIES, BLACKBERRIES AND DEWBERRIES.



SPRAYING POTATOES AND STRAWBERRIES.

CUT OUT THE FRUIT BEARING canes after the last picking has been made. This will lessen insect and disease troubles that may be harbored on the old canes and allow more room for the growth of the new canes.

ORANGE RUST may appear in May or June. It is easily identified by the bright orange color on the under sides of the leaves. There is no method of preventing this trouble. As soon as it is found, the bush should be dug out and burned. If allowed to remain the disease will spread and destroy many plants.

ANTHRACNOSE, identified by the grayish spots on the canes (also on leaves, but not conspicuous), is common in many berry fields. It does not yield to spraying unless very frequently done with bordeaux mixture and this may not be profitable. If desirable, make the first spraying when the new canes are 6 to 8 inches high and repeat every two weeks during the growing season.

Cutting out and burning the old canes immediately after fruiting will be of some benefit. In starting a new field, make a special effort to secure healthy plants.

"WORMS" or "SLUGS" might appear at any time. Spray with an arsenical if early in season, but if near picking time, use hellebore or pyrethrum.

Cut out and burn gouty galls, tree cricket eggs or borers in stems.

GENERAL TREATMENT FOR STRAWBERRIES.

Examine the young plants before setting them. Pick off all discolored or diseased leaves. If root lice are suspected, dip the roots in strong tobacco-water.

After the growth starts, spray with bordeaux and a poison to prevent the leaf spot and to destroy the leaf-roller insect that may be present.

For fruiting plantations, spray with bordeaux before blossoming and repeat ten days to two weeks later. After fruiting if the bed is to be fruited again, mow and burn over quickly (as on a day when there is a wind, to avoid burning the crowns of the plants). If leaf rollers have been present, spray with poison after the growth has started again, but before the leaves curl.

For strawberry root lice, see Michigan Bulletin No. 244, page 88.

GENERAL TREATMENT FOR POTATOES.

FOR THE POTATO SCAB. Soak the uncut tubers for two hours in 30 gallons of water and one pint of formalin (can be secured of any druggist). This solution can be used several times. Do not put treated tubers back into crates or bags that held scabby potatoes. Make the treatment only a few days before planting if possible. Do not plant upon land that has recently grown crops of scabby potatoes or beets.

FOR THE BLIGHT AND "BUGS." Begin spraying with bordeaux mixture and poison when the "bugs" first appear, or when the plants are about 8 inches high, and repeat about every 2 weeks as long as the plants are growing. Spray often in warm, muggy weather; fewer sprays are necessary in dry weather.

Use bordeaux mixture (6 pounds copper sulphate and 4 or 5 pounds of lime to 50 gallons of water, and put in the poison, about $\frac{1}{2}$ pound of Paris green or 2 pounds of arsenate of lead, or 1 quart of the stock solution of Kedzie mixture.)

Dilute lime-sulphur is not as good as the bordeaux mixture for potatoes.

WART DISEASE OF THE POTATO. This disease also is known as Black Scab, Canker or Cauliflower Disease. It attacks the tubers mainly. In a severe attack, big, dark warty excrescences sometimes as large as the tuber itself appear at the sides or ends. In advanced stages of the disease, the tubers are wholly covered by this growth and lose all resemblance to potatoes. In the final stages, the tubers turn to brownish black soft masses, giving off a very unpleasant odor. In very mild attacks, the tubers appear normal, but the eyes are found to have turned gray, then brown and finally black.

This disease is not known to be present in Michigan, but is likely to be

found at any time. No remedy is known. When once introduced into a field, the whole crop should be burned and no tuber from the field used for seed purposes. The field itself should not be used for potatoes for at least six or seven years and the disease should be reported together with specimens at the first outbreak or suspicion of outbreak to the Department of Botany, Michigan Agricultural College.

Send specimens in a tight mailing-case.

GENERAL TREATMENT FOR TOMATOES.

THE LEAF BLIGHT (*Septoria lycopersici* Speg.), caused serious losses in some tomato growing sections last season. This disease can be easily and cheaply controlled by proper spraying and growers should be equipped to do this important work.

In a test made last season by the Horticultural Department on the farm of Mr. G. C. Raviler at Plymouth, the best results were secured from four sprayings of Bordeaux mixture made with five pounds of copper sulphate, four pounds of stone lime and fifty gallons of water. The first spraying was made about a month after the plants had been set out and repeated every ten days or two weeks so that the new foliage was protected.

GENERAL TREATMENT FOR MUSKMELONS AND CUCUMBERS.

To protect these plants from fungous diseases spray with bordeaux mixture made with two pounds of copper sulphate, four pounds of stone lime and fifty gallons of water.

Begin spraying when the vines have runners a foot long and repeat once a week or every ten days as long as pickings are made.

Thorough sprayings of muskmelons and cucumbers will undoubtedly be a paying practice in most seasons.

Several insects interfere with the welfare of cucumber and melon vines. The cucumber beetle (striped) feeds on the leaves, and the young tunnel as grubs in the roots. Plant more seeds than are needed to produce vines and then thin out injured plants and dust with hydrated lime and flour of sulphur, (one of sulphur to five or six of lime) through coarse cloth. Some prefer arsenate of lead powder mixed with nine parts of hydrated lime. About the bases of the vines on the ground throw some tobacco dust to prevent beetles from laying eggs on stems. Paris green is not reliable on these tender vines.

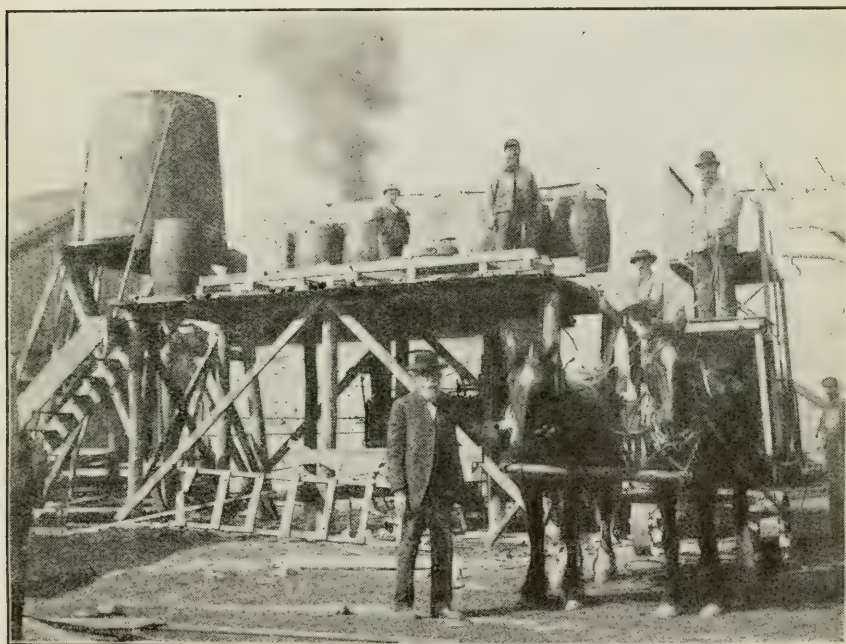
The cucumber louse usually starts in a few hills and then spreads over the field. Cold, wet weather being favorable to the louse. Some prefer to bury the first few vines attacked to retard spreading. A good spray is Persian insect powder, $\frac{1}{2}$ oz. to a gallon of water, spraying upward from beneath. The difficulty lies in getting the spray on to the lice. Each louse must be fairly hit to be killed.

The large black squash bug, or stink bug, not only feeds on vines but probably also carries the wilt. It may be trapped on cold nights under pieces of board and dropped into a can of water, having a little kerosene on top.

PREPARATION OF SPRAY MIXTURES.

STRONG LIME-SULPHUR.

Strong lime-sulphur to be used on dormant trees or bushes for scale insects, can be prepared in three ways:



A HOME COOKING PLANT.

An outfit for the cooking of the lime-sulphur at home. Water supply tank on the left. The cooking is done in barrels into which are extended perforated steam pipes. The steam is supplied by traction boiler.

By the old formula.

By reducing with water "the home-made" concentrated wash.

By reducing with water the "commercial" concentrated wash.

The "Old formula" has been used for many years with good results and is very satisfactory. The formula is as follows:

Lump lime	20 pounds
Sulphur (flour)	15 pounds
Water (hot) to make	50 gallons

The lime is slaked with a small amount of water (hot if lime is sluggish) and the sulphur is added, fifteen or twenty gallons of water are then added, and the mixture boiled. (It should take three-quarters of an hour, or an hour of good boiling with frequent stirring.) When done the liquid should be amber colored and fairly clear. Strain, dilute with water (hot is preferable) to make (up to) 50 gallons, and apply warm, through a coarse nozzle.

If small quantities are required, use an iron kettle to boil it in. If larger quantities are to be used, live steam is preferable for boiling purposes, either in a tank or in barrels.

Applied just before the buds swell, it coats the branches in such a way as partially to hinder from settling down, such pests as the oyster-shell, scurfy scale, some aphids and other insects.

HOME-MADE CONCENTRATED LIME-SULPHUR WASH.

Growers, having cooking plants, can make the lime-sulphur wash in a "concentrated" solution. This may be an economy of time, as large quantities can be made early in the season and stored until needed.

It is difficult to make this wash of uniform strength. For this reason, every batch that is made must be tested with a hydrometer and diluted accordingly.

The difficulty of getting a solution of uniform strength, apparently depends on the lime, which varies in composition and strength. Lime that contains more than five per cent of magnesium oxide and less than 90 per cent of calcium oxide does not combine in the cooking with the sulphur in a way to make a good mixture. Special "spraying lime" is now on the market.

There are several ways of combining the lime and sulphur, but always there are two parts, by weight, of sulphur to one of stone lime. The following three formulas are in common use:

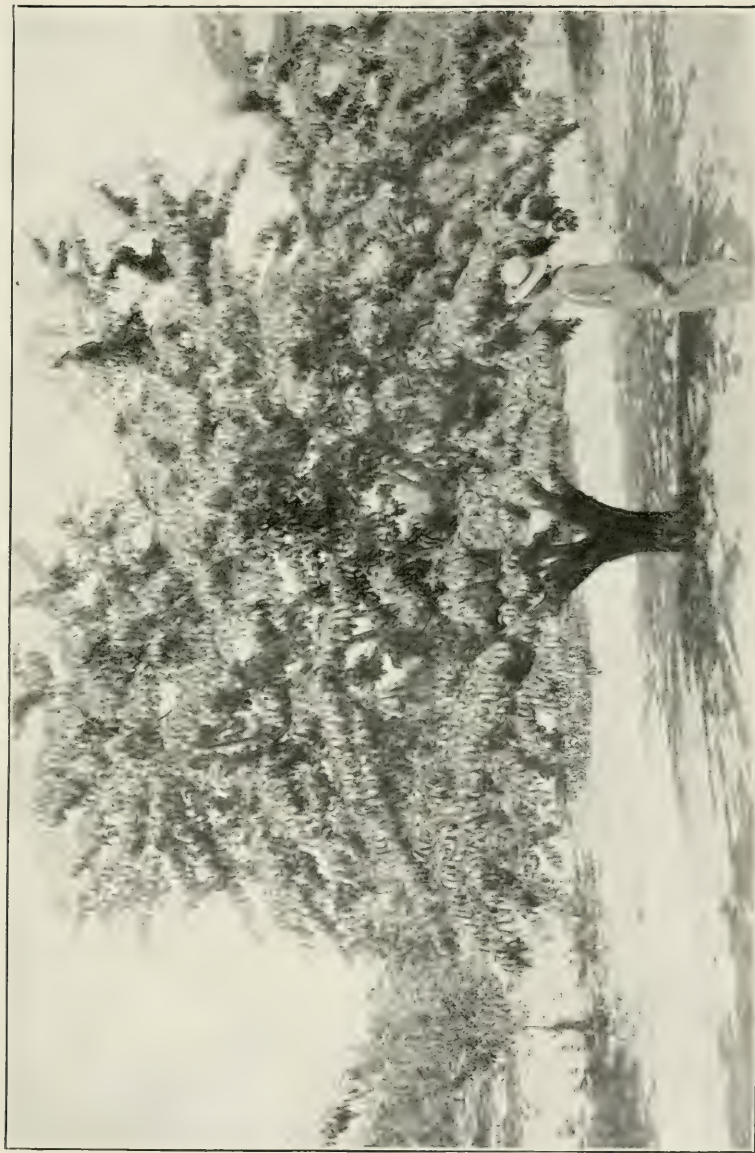
Stone lime	75 lbs.	}	or	{	60 lbs.	}	or	{	40 lbs.
Sulphur	150 lbs.				120 lbs.				80 lbs.
Water	50 gal.				50 gal.				50 gal.

The lime is slaked to a thin paste and the sulphur is added. Boil for one hour and stir frequently. Water enough should be added so that there will be fifty gallons at the end of boiling.

After it is cooked, if not to be used at once, it should be strained into a barrel which should be air tight, as exposure to the air causes the sulphur compounds to lose their value for spraying purposes. Each lot that is cooked should be tested with a hydrometer when cooled and diluted, according to the dilution table on last page, when applied.

COMMERCIAL CONCENTRATED LIME-SULPHUR WASH.

There are several brands of the "commercial" concentrated lime-sulphur solution now upon the market. The use of these instead of the home cooked kinds is becoming more and more common every year, especially by fruit growers who do not care to take the time or trouble to cook the material for themselves or if they do not have good facilities to do so. They are now reasonable in price,—of fairly uniform strength, and do add to the ease of getting ready to spray as all that is necessary is to dilute with the required quantity of water.



Windsor Cherry tree on the M. J. Gilmore farm, on the Grand Traverse peninsula. This tree has made returns as follows: 1908, \$16; 1909, \$32; 1910, \$28.20; 1912, \$42.

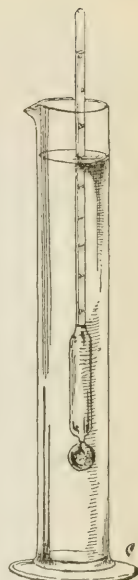
TESTING AND DILUTING CONCENTRATED LIME-SULPHUR.

Every "batch" of the home made concentrated lime-sulphur wash will have to be tested when cooled to determine its strength and it will be well to test the "commercial" brands. This testing is done with a Baume hydrometer. It is a simple instrument used to determine the weight and density of liquids. It is made of glass, is about a foot long, and has a graduated scale on the side.

It is absolutely necessary that the hydrometer be kept *perfectly clean*. If the solution is allowed to dry on it an accurate test cannot be made.

It can be purchased from dealers in druggists' supplies or from Bausch and Lomb Optical Company, Rochester, N. Y., or Whitall Tatum Company, Philadelphia, Pa., or Taylor Instrument Companies, Rochester, N. Y.

(See last page for the rates of dilutions.)



AMOUNT OF SULPHUR IN SOLUTION.

The relation between the "Baume Test" and the sulphur in solution in the commercial or home made concentrated lime-sulphur wash can be determined from the following table:

Density, degrees. Baume.	Total sulfur. %	Pounds of sulfur in one gallon of solution.
33.....	26.0	2.7
32.....	25.0	2.6
31.....	24.0	2.5
30.....	23.0	2.4
29.....	22.0	2.3
28.....	21.0	2.2
27.....	20.0	2.1
26.....	19.5	2.0
25.....	19.0	1.9
24.....	18.5	1.8
23.....	18.0	1.8
22.....	17.75	1.7
21.....	17.0	1.6
20.....	16.75	1.6
19.....	16.25	1.5
18.....	16.0	1.5
17.....	15.5	1.4

DILUTE LIME-SULPHUR SOLUTION.

For spraying on the foliage of apples, pears, European plums and cherries but not on peaches or Japanese plums, grapes or potatoes.

This solution can be prepared for use in several ways.

First, The "Commercial" concentrated lime-sulphur solution can be diluted to the proper strength.

Second, The "home made" concentrated lime-sulphur can be diluted to the proper strength.

Third, The solution can be made at any time and in any quantity as follows: Boil in a few gallons of water for one hour, *twice* as many pounds of sulphur as of lime, strain and dilute with water so there will be 8 pounds of sulphur to every 100 gallons.

Example: To make 100 gallons of spray solution, boil 8 pounds of sulphur and 4 pounds of lime as directed.

SELF-BOILED LIME SULPHUR MIXTURE.

This is a mixture of lime, sulphur and water and not like any of the other lime-sulphur sprays. It does not (when properly made) injure tender foliage and is very valuable for spraying peaches and Japanese plums. The formula is:

Lump lime	8 pounds.
Sulphur	8 pounds.
Water	50 gallons.

The mixture can be prepared better by using thirty-two pounds of lime, thirty-two pounds of sulphur, and eight or ten gallons of water, and then diluting to 200 gallons.

Place the lime in a barrel and add enough water to almost cover it, as soon as the slaking begins, add the sulphur, which should be run through a sieve to break up the lumps.

Stir constantly and add enough water to make a thick paste and then, gradually, a thin paste. As soon as the lime is well slaked, cold water should be added to cool the mixture and prevent further cooking. It is then ready to be strained into the spray tank, diluted up to the full formula, and used.

Care must be taken not to allow the boiling to proceed too far, if the mixture remains hot for fifteen or twenty minutes after the slaking is completed, some sulphur will go into solution and injury to the foliage may result.

The time of adding the cold water to stop the boiling depends upon the lime. With a sluggish lime all the heat in it may be needed, while with limes that become intensely hot, care must be taken not to allow the boiling to proceed too far.

SOLUBLE SULPHUR POWDER.

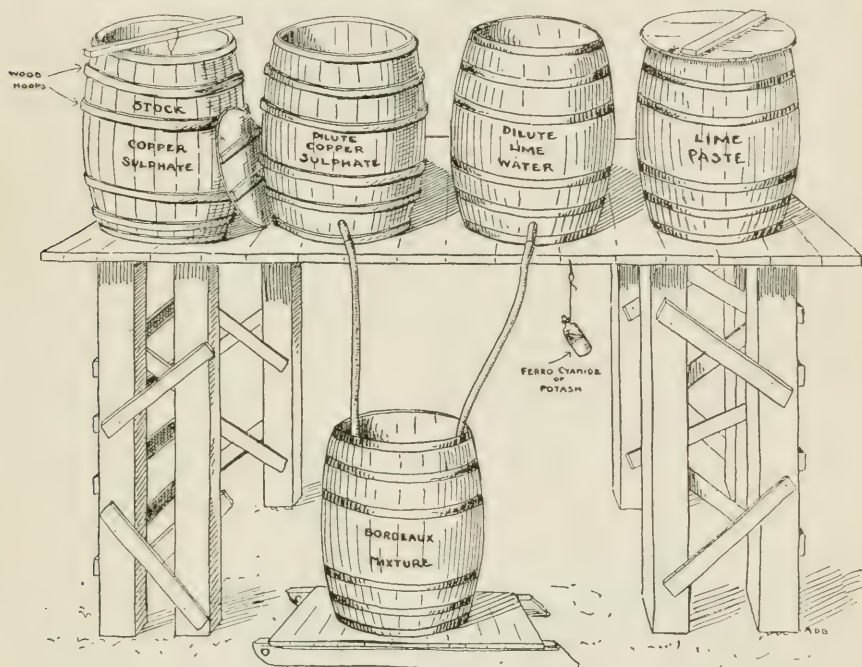
Soluble sulphur powder, although it is less known than other sulphur compounds, has proven in our tests, of about equal value with commercial lime sulphur when used as a Winter spray on dormant trees against the San Jose scale.

BORDEAUX MIXTURE.

Bordeaux mixture is made of copper sulphate, lime and water.

These three substances are combined in various proportions, depending upon the kind of plant to be treated. For apples, pears, cherries and plums (except Japanese varieties) the preparation is usually four

pounds of copper sulphate, with about the same amount of lime, to fifty gallons of water. Poison is added as needed. The copper sulphate will readily dissolve in two gallons of hot water, to which should be added enough water to make twenty-five gallons or one-half barrel. Do not use an iron or tin vessel to dissolve this in, as the copper sulphate will de-



stroy it, and besides the iron will spoil the bordeaux. A wooden pail is good. Slake the lime into a thin paste and add water to make twenty-five gallons. Pour, or let these run together into a third barrel, and the bordeaux is made. When it is emptied into the spray barrel or tank, it should be strained through a brass wire strainer to catch any of the coarse particles.

Whenever it is necessary to use a quantity of the mixture, it is desirable to have the lime and copper sulphate in "stock solutions." A quantity of lime is slaked to a paste and held so by being covered with water. The copper sulphate, say fifty pounds, is placed in a clean gunny sack and suspended in a barrel (one with wood hoops is much to be preferred) containing twenty-five gallons of water. This will dissolve in about a day. One gallon of this "stock solution"* is equal to two pounds of copper sulphate.

A good quick way to combine these three substances is as follows: Put the amount of the "stock solution" of copper sulphate required in a barrel, and add enough water to make 25 gallons, or one-half barrel. Put about 7 pounds of the lime paste in a barrel and add 25 gallons of water, making a thin whitewash. Pour, or let these two run together into a third barrel, or directly into the spray barrel or tank, being sure

*Always stir this "stock solution" before dipping any out, in order that what is used may be full strength.

to strain. When partly run in, test with ferro-cyanide of potash† to make sure enough lime has been used. If Paris green, arsenate of lead, or any other poison is to be used, make it into a thin paste with a little water and add it to the bordeaux mixture, which is now ready to be used.

COPPER SULPHATE SOLUTION.

Copper sulphate solution is copper-sulphate dissolved in water. It is used by some growers to spray peach trees to prevent the leaf curl where a spraying for scale insects is not required. Two pounds of copper sulphate to 50 gallons of water is strong enough for this purpose.

POISONS USED IN SPRAYING.

For Insects That Chew.

ARSENATE OF LEAD.



This poison is used very extensively. It can be secured for a reasonable price, is ready to use at any time, does not easily injure the foliage and is the only poison that can be safely used in the lime-sulphur sprays.

Injury to tender foliage like the peach has occasionally occurred by spraying with arsenate of lead and water when the foliage was moist from dew or rain. If necessary to spray tender foliage (peaches or Japanese plums) at such a time it would be well to add 3 to 5 pounds of slaked lime to every 50 gallons of the spraying material.

Arsenate of lead is usually sold in kegs or "kits" or small barrels in the form of a paste. Some companies have it in a powdered form. This form usually costs twice as much or more per pound as the paste form and since it does not contain much water only one-half the amount in weight should be used as is recommended for the paste form.

A simple, easy way to work the thick pasty arsenate of lead into a thin, smooth paste (as it should be before using either alone or in something) is to put the amount required in a keg; add water and churn with a dasher. This is much quicker than to use a paddle.

PARIS GREEN AND LIME.

Always use lime with paris green, it makes the poison stick better, besides greatly reducing the danger of burning the foliage.

† This chemical can be secured of any druggist. Ten cents, worth dissolved in a pint of water will be enough for a season. Drop a very little in the bordeaux, if a reddish brown color appears more lime must be added. If there is no discoloration, there is enough lime. Ferro-cyanide of potash is extremely poisonous, so observe great care in its use.

For spraying from a barrel, the writer has found the following method very useful: Place from one-quarter to one-half pound of good lump lime, or unslaked lime, in each of three or four tin pails which will hold about three quarts or less. Old cans or crocks will answer just as well. Add enough hot water to slake it into a thin cream or paste. Now add to each lot, one-quarter pound of paris green, previously weighed out, and placed in paper bags, stir while the lime is hot and allow to stand for some time. Now measure out about forty-four gallons of water in your spraying barrel, and make a mark that will show how high it comes in the barrel, add the contents of one tin pail (viz., one-quarter of a pound of paris green and one-half pound of quick-lime slaked) into the forty-four gallons of water in the barrel. Stir well and spray. The pails or crocks can be used one at a time and refilled occasionally so that the stock is always on hand ready for use.

ARSENATE OF SODA—KEDZIE FORMULA.

This form of poison was originated at this Station by the late Dr. R. C. Kedzie.

This is a cheap, effective poison that can be prepared at home. It is used by many of the grape growers of Michigan in combination with the bordeaux mixture. It cannot be used in the lime-sulphur sprays. If used alone—as is sometimes done for potato bugs—slaked lime must be added or the foliage will be burned.

The formula is:

White arsenic	2 pounds
Sal Soda (commonly called washing soda).....	8 pounds
Water	2 gallons

Boil these materials in any iron pot or kettle *not used for other purposes* for about 15 minutes or until the arsenic dissolves, leaving only a small muddy sediment. Put this solution into a jug or other vessel that can be closed tightly and labeled "Poison."

One quart of this solution is equal to $\frac{1}{2}$ pound of Paris green. For most spraying one quart in 50 gallons of water (with some lime) or bordeaux mixture will be sufficient.

CONTACT INSECTICIDES, FOR INSECTS THAT SUCK.

KEROSENE EMULSION.

Place two gallons of ordinary kerosene in a warm place, either in a warm room or in the sun, and allow to become as warm as possible without danger from fire. Boil one pound of laundry soap or whale oil soap in a gallon of soft water until completely dissolved. Remove the soap solution from the fire, and while still boiling hot, add the kerosene and agitate vigorously for ten minutes, or until the oil is emulsified, with a spraying pump by forcing the liquid back into the vessel from which it was pumped. When the liquid is perfectly emulsified it will appear creamy in color and will flow evenly down the side of the vessel when allowed to do so. Care should be taken to completely emulsify the oil and this is accomplished much more easily when the mixture is hot.

This strong emulsion may now be readily diluted with water and used, or it may be stored away for future use. When cold it becomes like sour milk in appearance and should be dissolved in three or four times

its bulk of hot water before diluting with cold water. If the water is at all hard, "break" it by adding a little sal soda before putting in the soap.

Small amounts of this emulsion may be made by using the ingredients in small quantities, but in the same relative proportion. It is used at the rate of eight or ten parts of water to one part of emulsion.

HELLEBORE.

White hellebore is the powdered root of a plant. It kills both by contact and as an internal poison. It may be applied either dry or in the form of a liquid. When used dry it should be mixed with three or four times its weight of flour or of plaster and then dusted on the insects. Applied wet, one pound should be mixed with twenty-five gallons of water and this liquid applied as a spray.

INSECT POWDER, BUHACH, PYRETHRUM.

This valuable remedy has one drawback, its cost. It is too expensive for use on a large scale. It kills insects through their breathing pores, but is harmless to man and beast. It will kill many of the insects of the garden if dusted on or applied as a spray at the rate of one ounce to two gallons of water.

Use the powder when it is undesirable to use poison, but never buy any unless it comes in tightly sealed packages. It loses its strength on short exposure to the air. An hour will suffice to weaken it. It must be applied from time to time, as it quickly loses its strength.

TOBACCO.

Tobacco in the form of dust may be obtained of the large manufacturers for a few cents a pound.

It is useful in destroying root-lice, especially wooly-aphis, in young trees, and in keeping insects from garden truck. For root-aphis, incorporate four to six handfuls of tobacco dust into the soil about the roots and induce a thrifty, healthy growth by using liberal quantities of nitrate of soda or barnyard manure early in the spring.

A *strong* infusion or tea made of waste will kill plant lice if sprayed when they first appear.

Nicotine is to be had now in concentrated form. It is more often sold about 40 per cent strong. This may be diluted many hundreds of times before applying. As there is a diversity of grades and brands to be had, it will be well to use the strength recommended by the makers.

HYDRATED LIME.

Finely slaked lime is often useful because of its slight caustic properties. Against such larvae of saw-flies and beetles as are sticky, for instance, those of the cherry-slug and asparagus-beetle, it may be used as a substitute for poison, if the latter, for some reason is undesirable.

Stone lime may be slaked with a small amount of hot water, using just enough to turn it to a dry powder. Such slaked lime is as fine as flour and very soft to the touch, having very little grit. Use a metal pail or kettle to slake in, as the heat may set fire to wood. Do not use too much water, and where possible, use freshly burned lime.

Hydrated lime may be used in making bordeaux mixture, but it is not as reliable as good, fresh, lump lime. It is less adhesive, not as strong

(so more should be used) and more expensive. The one advantage is that it is a little easier to use.

Ground lime for making bordeaux mixture acts exactly like lump lime, if fresh, but this is difficult to determine as it is already in a powder.

CAUTIONS.

Do not spray while plants are in bloom. It is prohibited by law, except when canker-worm is present, and may destroy bees and other beneficial insects.

Do not dissolve copper sulphate in an iron or tin vessel. It will ruin the vessel and spoil the spraying solution.

For all spraying solutions containing copper sulphate, the pump must be brass or porcelain lined.

Wash out pump and entire outfit each time after using.

Use arsenate of lead on stone fruits in preference to other forms of arsenical poisons. It is less liable to burn the foliage.

Do not spray fruits or plants with poison within a month or more of the time when they are to be picked.

Keep all "stock solutions" covered to prevent evaporation.

Do not spend money for freak "cure-alls" such as powders to be put into a hole bored in the trunk or limbs of trees or liquids to be diluted and poured on the ground beneath the trees. They may do considerable harm.

WHEN THE CODLING-MOTH FLIES.

While the first week in August is a good average time for applying an arsenical spray for the second generation of the Codling-moth in Michigan, it is well to remember that seasons vary, and that the time set aims merely at an average. To determine exactly each year just when to get the highest efficiency out of a spray, for a particular locality, requires only a few hours of work, providing one can find some neglected apple trees near at hand.

First of all scrape off all loose bark-flakes from the trunk and limbs of several trees, thus destroying all the natural places for the hiding away of the cocoons. The scraping is most easily done while the bark is soft after a prolonged rain.

Next, make some bands of burlap six or eight inches broad and three or four layers thick; place one around the trunk of each prepared tree and fasten with a headless wire nail driven into the tree so that the band can easily be removed. Do this in June so that the cloth may become weathered before the time for spinning. The larvae in searching for a good place to spin cocoons will find the bands, in the absence of other protection, and spin cocoons there.

Occasional examinations during July will reveal these cocoons, which should be carefully removed by cutting out a small bit of the cloth to which each is fastened.

Place all these bits of cloth with the cocoons attached in a cage made of a lantern globe or some other glass cylinder open at top and bottom, and then tie a bit of mosquito netting over the top to confine the insects when they come out of the cocoons. If the lantern globe is set on a little soil in a flower pot and the soil is kept just slightly moist, the chances of getting the moths out are increased.

Now put the cage thus prepared in a shady place where the sun cannot

strike it to sweat it, and where the rain cannot penetrate. Outside of protection from rain and sun the conditions should be as near those of the outside as possible. Keep the soil in the pot just moist and look for the moths often during late July for they will hide down under the layers of burlap and may be overlooked. When you see them in the cage, then you will know that they are laying eggs in the orchard and the time to spray is just before the young hatch and go into the fruit, which is about a week or ten days later, not afterward. Of course, they do not come out all together, but string along over quite a period.

TABLE OF DILUTIONS FOR CONCENTRATED LIME-SULPHUR WASH.

To spray for San Jose and other scale insects.		Summer Sprayings for Apples, Cherries, and European Plums.	
If Baume test is	Amount below should be diluted to 50 gallons.	If Baume test is	Amount below should be diluted to 50 gallons.
33	$6\frac{1}{4}$ gallons	33, 32 or 31	$1\frac{1}{4}$ gallons
32	$6\frac{1}{2}$ gallons	30, 29 or 28	$1\frac{1}{2}$ gallons
31	$6\frac{3}{4}$ gallons	27, 26 or 25	$1\frac{3}{4}$ gallons
30	7 gallons	24, 23 or 22	2 gallons
29	$7\frac{1}{2}$ gallons	21, 20 or 19	$2\frac{1}{4}$ gallons
28	$7\frac{3}{4}$ gallons		
27	$8\frac{1}{4}$ gallons		
26	$8\frac{3}{4}$ gallons		
25	9 gallons	Summer Spraying of Pears.	
24	$9\frac{1}{2}$ gallons		
23	$9\frac{3}{4}$ gallons		
22	10 gallons		
21	$10\frac{1}{2}$ gallons	33, 32 or 31	1 gallon
20	$10\frac{3}{4}$ gallons	30, 29 or 28	$1\frac{1}{4}$ gallons
19	$11\frac{1}{4}$ gallons	27, 26 or 25	$1\frac{1}{2}$ gallons
18	$11\frac{1}{2}$ gallons	24, 23 or 22	$1\frac{3}{4}$ gallons
17	12 gallons	21, 20 or 19	2 gallons



Sweet Cherry Orchard of J. E. Merritt, Manistee county.

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(Auxiliary to State Society.)

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Charles A. Bingham, Birmingham,	-	-	-	-	-	-	-	President.
W. D. Flint, Novi,	-	-	-	-	-	-	-	Vice-President.
Sarah E. Sly, Birmingham,	-	-	-	-	-	-	-	Secretary.
Charles B. Pettibone, Farmington,	-	-	-	-	-	-	-	Treasurer.
R. J. Coryell, Birmingham,	-	-	-	-	-	-	-	Prompter.
A. L. Ross, Rochester	}							
Harry McCracken, Farmington								
James N. Cobb, Birmingham								
H. J. Broughton, Birmingham		-	-	-	-	-	-	Executive Committee.

MEMBERS.

J. F. Deacon, 28 Connecticut Ave., Detroit, Mich.	Arthur H. Shultz, Pontiac, R. 7.
C. W. Haven, Royal Oak, R. 2.	E. Foster, Clarkston.
E. J. Ver Duyn, Novi, R. 1.	Caleb Jackson, Birmingham.
F. P. German, Birmingham, R. 2.	F. B. Howlett, Pontiac.
A. H. Beebe, Birmingham, R. 2.	Thomas R. Beddow, Birmingham, R. 1.
Stanley, Case, Franklin.	Frank Tanner, Pontiac.
L. B. Flint, Novi.	Homer Cummings, Pontiac, R. 5.
Carl Tibbits, Farmington, R. 3.	James H. Cutcherson, Orion, city address
Charles Bingham, Birmingham, R. 2.	Detroit Beef Co., Detroit, Mich.
H. J. Broughton, Birmingham, R. 2.	George Bingham, Birmingham, R. 2.
W. J. Spicer, Birmingham, R. 2.	W. R. Marvin, Pontiac.
R. J. Coryell, Birmingham, R. 2.	Howard Masters, Birmingham, R. 5.
W. D. Flint, Novi.	Walter A. Carpenter, Troy.
J. A. Graley, Pontiac, R. 6.	Ernest E. Green, Orchard Lake.
John Kleine, Birmingham, R. 2.	Visgar Spicer, Birmingham, R. 1.
Volney Miller, Birmingham, R. 1.	Floyd Leach, Birmingham, R. 2.
Miss Sarah E. Sly, Birmingham, R. 2.	Edwin Leach, Birmingham.
Miss Addie Sly, Birmingham.	William A. Bassett, Birmingham, R. 5.
Edwin Miller, Birmingham, R. 2.	Sidney Colby, Birmingham, R. 2.
Thomas H. Thurber, Birmingham, R. 2.	Charles Knowles, Pontiac, R. 3.
Albert Sloop, Birmingham, R. 2.	L. L. Seeley, Pontiac, R. 3.
R. D. Bird, Birmingham, R. 2.	Edward Colby, Birmingham, R. 2.
A. C. McGraw, Birmingham.	Casper Case, Birmingham.
J. T. Miller, Birmingham, R. 2.	Jackson Voorheis, Davisburg, R. 1.
R. J. Beattie, Birmingham, R. 2.	Bert Foreman, Birmingham, R. 2.
William Storey, Birmingham, Briar Bank Farm.	Albert Bradway, Birmingham.
James W. Cobb, Birmingham.	Clarence Higby, Birmingham, R. 2.
S. H. Tyrer, Pontiac.	Louis Steinkopf, Pontiac, R. 5.
C. L. Rockweed, 180 Franklin Ave., Pontiac.	William Benedict, Orchard Lake, R. 1
Morris M. Jay, Pontiac, R. 5.	(Box 81).
Elmer Evans, Birmingham, R. 2.	George Stoll, Birmingham, R. 1.
Ward Eagle, Farmington, R. 1.	Ezra Chamberlain, Orion, R. 3.
Raymond H. Hyde, Farmington, R. 3.	Alvin Leach, Birmingham, R. 2.
H. W. Green, Orchard Lake, R. 1.	B. D. Wood, Birmingham, R. 2.
J. W. Strong, Pontiac, R. 3.	Chas. Johnston, Franklin.
S. E. McKinney, Birmingham.	A. H. Whitmer, Birmingham, R. 2.
Charles Pettibone, Farmington.	G. A. Cottrell, Milford, R. 5.
William A. Harmon, Pontiac.	Arch Stoddard, Leonard.
Bert G. Beebe, Holly.	Andrew Bowden, Franklin.
Jacob Perry, Goodison.	O. L. Murray, Walled Lake.
H. C. Gatzka, Birmingham, R. 2.	Arthur Snook, Rochester.
	A. J. Tibbits, Farmington. (Died Nov., 1912.)
	John Landow, Farmington.

H. N. McCracken, Farmington.
 Edwin H. Seeley, Novi.
 H. C. Bartlett, Farmington.
 Carl Hatten, Farmington.
 Fred Bade, Farmington.
 J. B. Halstead, Farmington.
 Frank N. Steele, Farmington.
 E. S. Sprague, Farmington.
 L. B. Robb, M. D., Leonard.
 Otto A. Park, Birmingham.
 Mrs. Henry C. Ward, Pontiac.
 Harrison Walter, Clarkston.
 Almon Parks, Birmingham.
 E. S. Letts, Rochester.
 G. S. Brodie, Pontiac.
 L. N. Howard, Farmington.
 S. G. Foreman, Birmingham.
 H. E. Moore, Orchard Lake.
 Mrs. S. H. Tyrer, Pontiac.
 Peter Voorheis, Pontiac.
 H. J. Ross, Rochester.

Bert Tyack, Troy.
 Henry C. Ward, Pontiac.
 A. Scott, Pontiac.
 E. E. Sweet, Birmingham.
 A. L. Ross, Rochester.
 Jackson, Voorheis, Davisburg.
 W. J. Bailey, Troy.
 Walter German, Birmingham.
 W. A. Newman, Pontiac.
 Duane Tibbitts, Farmington.
 Orlando J. Munro, Novi.
 Henry M. Leland, Detroit.
 L. R. Hunter, New Hudson.
 Mrs. L. R. Hunter, New Hudson.
 A. E. Fleckinger, Rochester.
 Z. H. Curtis, Leonard.
 J. C. Chamberlin, Leonard.
 W. W. Graham, Rochester.
 P. J. Meiser, Detroit.
 C. G. Ladd, Rochester.

The Oakland County Horticultural Society closes its first year with a membership of 123.

Seven meetings have been held at the following places with prominent speakers: Birmingham and Pontiac, Organization Meetings, with Mr. T. A. Farrand, President of State Horticultural Society as speaker.

Birmingham, Mr. C. E. Bassett, Secretary of State Horticultural Society, as speaker. Farmington, (Union Meeting with Farmington Dairymens Association), with Rev. George E. Gullen, Farmington; Mr. N. A. Clapp, Northville, a Member of the State Detroit Board of Health; Mr. H. N. McCracken, Farmington, as speakers.

Sly Farms, Birmingham, Prof. L. R. Taft, Agricultural College, as speaker.

Mr. J. A. Graley's, near Pontiac, with Prof. L. R. Taft, as speaker.

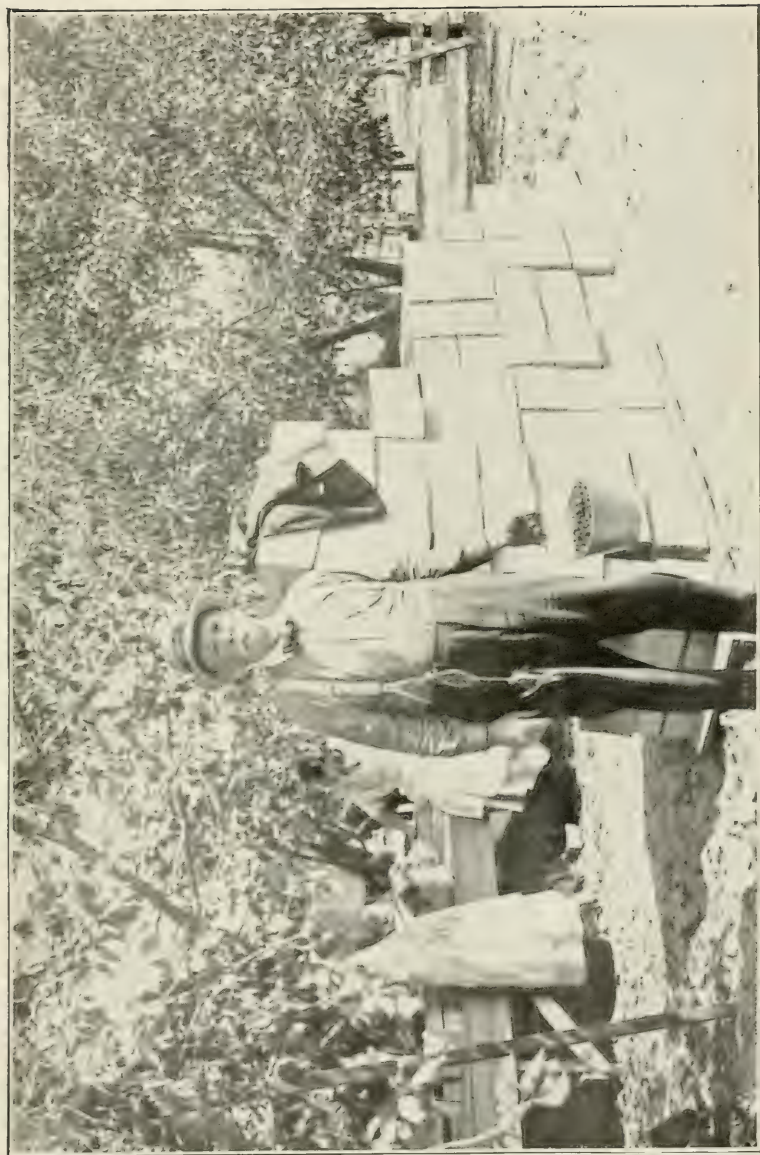
Mrs. H. C. Ward's, Square Lake.

Mr. L. B. Flint's, Novi, Mr. O. K. White, Field Agent in Horticulture, Agricultural College, as speaker.

Mr. A. L. Ross, Rochester, with Mr. R. J. Coryell, as speaker.

The meetings have been very instructive and of great benefit to horticulturists.

The first exhibit at the State Fair, under the auspices of the Society, was a creditable showing of apples for the county. Great credit is due the Chairman, R. J. Coryell, for his efforts in securing the display of fruit. Fourth prize was awarded.



M. D. Morgan, Superintendent of the B. J. Morgan fruit farm near Traverse City, during Cherry harvest.

MANISTEE COUNTY HORTICULTURAL SOCIETY.

(Auxiliary to State Society.)

The Manistee County Horticultural Society, auxiliary of the Michigan State Horticultural Society, was organized at Bear Lake, January 26, 1912.

OFFICERS.

President—Edwin S. Russell,	-	-	-	-	-	-	-	-	Manistee.
Vice-President—Arlie L. Hopkins,	-	-	-	-	-	-	-	-	Bear Lake.
Secretary—Jos. F. Brunais,	-	-	-	-	-	-	-	-	Chief.
Treasurer—Wm. F. Milarch,	-	-	-	-	-	-	-	-	Bear Lake.

MEMBERS.

Geo. Crook, Bear Lake.
 Bert Bowling, Bear Lake.
 Arch Marshall, Bear Lake.
 Archie Graham, Bear Lake.
 Stanley Mallison, Bear Lake.
 Ed. Oleson, Bear Lake.
 Louis Lingg, Bear Lake.
 Bruce McIntosh, Bear Lake.
 H. M. Jones, Chief.
 Mrs. H. M. Jones, Chief.
 Mrs. Mary Burmeister, Onokama.
 Geo. Appleton, Bear Lake.
 Mrs. Nellie Wector, Bear Lake.
 Miss Mable Richmond, Bear Lake.
 K. M. Jones, Bear Lake.
 Fred Bradford, Bear Lake.
 Geo. Kuenzer, Bear Lake.
 J. C. Merritt, Manistee.
 S. L. Smith, Bear Lake.
 C. J. Milarch, Bear Lake.
 Matthew Lutz, Chief.
 Tom Quinlan, Arcadia.
 F. E. Brunais, Chief.
 Fred Herrmann, Chief.
 J. E. Cody, Bear Lake.
 Richard Graham, Bear Lake.
 L. D. Connelly, Bear Lake.
 Joseph Patterson, Chief.
 P. C. Chamberland, Arcadia.
 J. C. Strickler, Bear Lake.
 Jas. H. Millard, Bear Lake.
 C. N. Russell, Manistee.
 H. M. Cosier, Bear Lake.
 Mrs. Geo. Cole, Bear Lake.
 Donald Crouch, Onokama.
 N. C. Bertelson, Bear Lake.
 Peter H. Lass, Bear Lake.
 L. A. Herkelrath, Pierport.
 E. O. Thompson, Bear Lake.
 Chris Shively, Chief.
 Roy Welch, Bear Lake.
 Jim McGuire, Bear Lake.
 R. W. Smith, Manistee.
 Geo. A. Hart, Manistee.
 T. J. Elton, Manistee.
 James Mullen, Manistee.

L. S. Ramsdell, Manistee.
 R. R. Ramsdell, Manistee.
 James A. King, Manistee.
 Magnus Nelson, Manistee.
 C. B. Jentoft, Manistee.
 H. C. Bright, Manistee.
 Harlan MacMullen, Manistee.
 H. W. Marsh, Manistee.
 Lawrence Marsh, Manistee.
 Thomas W. Ferguson, Manistee.
 Herbert L. Harley, Manistee.
 Dudley A. Siddal, Manistee.
 B. R. Hindel, Manistee.
 C. H. Morey, Manistee.
 J. M. Peterson, Manistee.
 T. J. Ramsdell, Manistee.
 F. A. Mitchell, Manistee.
 A. E. Moen, Chief.
 O. C. Moen, Chief.
 John Cushing, Bear Lake.
 Geo. W. Holler, Bear Lake.
 Fred Baird, Arcadia.
 Carl Pickert, Arcadia.
 Charley Starke, Arcadia.
 Henry Montler, Arcadia.
 John Bradford, Arcadia.
 D. J. Martineau, Arcadia.
 Carl Bigge, Arcadia.
 Chas. P. Matteson, Arcadia.
 Wm. D. Ebert, Arcadia.
 H. J. Lang, Arcadia.
 Adolph Hasse, Arcadia.
 Jackson & Oppenheim, Arcadia.
 Edwards Bros., Arcadia.
 Shira Bros., Arcadia.
 Mary E. Carr, East Lake.
 Walter L. Dietz, Onokama.
 E. F. Marr, Bear Lake.
 Mrs. Jane Probert, Bear Lake.
 Fred Smith, Arcadia.
 Walter Kebaugh, Arcadia.
 H. C. Fox, Bear Lake.
 Lumen Garven, Bear Lake.
 A. J. L. Keddle, Bear Lake.
 Joseph Floersch, 7444 Normal Ave.,
 Chicago.

Our Horticultural Society was organized at Bear Lake, January 26, 1912.

The first meeting was held at Bear Lake, March 6, and devoted mostly to business affairs.

The second meeting was held April 9, at the same place. The program was in charge of local fruit growers. J. E. Merritt and Wm. Milarch spoke on the planting of young orchards. Most everything pertaining to planting of fruit trees was discussed.

A. L. Hopkins gave an interesting talk on spraying, warning fruit growers to be sure to spray on time. He also showed several different styles of nozzles and sprayer fixtures, telling which was most satisfactory.

The meeting in May was held in Geo. W. Hopkins and Sons orchards at Bear Lake. Mr. O. K. White, of M. A. C. was present and gave demonstrations in pruning and spraying.

June 21st a meeting was held at Onekama. Professor Eustace spoke on the management and cultivation of orchards, use of fillers and cover crops, girdling of trees to produce fruit when young, etc. Professor Patten spoke on fertility of soils, fertilization and liming. That these are subjects of interest to the farmers of Manistee county was proven by the interest displayed and questions asked.

There was a large attendance at the meeting at Bear Lake, August 19. Wm. C. Smith of Delphi, Indiana, author of "How to grow 100 bushels of corn per acre on worn out soil," gave an interesting talk on the restoration of worn out soil by the use of cover crops and green manuring. Mr. Smith claims that he can build up any soil in the country by plowing under rye and winter vetch.

E. H. Dow, President of the Dow Chemical Works, told of his first experience at truck farming on three acres of poor, sandy soil and some of the things he learned thereby. He also gave his method of planting trees.

Professor Hedrick of the New York Experiment Station gave the results of some experiments in pruning and fertilization conducted at the station.

There was no regular meetings held in September and October but Mr. White gave a demonstration in grading and packing apples, before members of the society in October.

SUTTONS BAY FRUIT GROWERS' ASSOCIATION.

(Auxiliary to the State Society.)

OFFICERS FOR 1913.

Albert F. Freeland,	-	-	-	-	-	-	-	-	-	President.
Theodore Asch,	-	-	-	-	-	-	-	-	-	Vice-President.
Claus Van Glahn,	-	-	-	-	-	-	-	-	-	Treasurer.
W. M. Payne, M. D.,	-	-	-	-	-	-	-	-	-	Secretary.

MEMBERS.

Chas. Krupt, Maple City, R. F. D.
 Albert Freeland, Omena.
 Philip Ejeler, Suttons Bay.
 Geo. Smeltzer, Suttons Bay.
 Dunkelon Bros., Suttons Bay.
 Wm. Crocker, Suttons Bay.
 John Bremer, Suttons Bay.
 Fred Otto, Suttons Bay.
 Louis Sill, Suttons Bay.
 Anna Reynolds, Suttons Bay.
 Ole Larson, Suttons Bay.
 John Weisler, Suttons Bay.
 Al. Smith, Suttons Bay.
 Nels Aleson, Suttons Bay.
 Henry Kahrs Sr., Suttons Bay.
 Philip H. Portner, Suttons Bay.
 Wm. Horn, Suttons Bay.
 Theo. Asch, Suttons Bay.
 Morgan Steele, Suttons Bay.
 John Wald, Suttons Bay.

Mat Spinniken, Suttons Bay.
 Henry Kahrs, Jr., Suttons Bay.
 Wm. Van Glahn, Suttons Bay.
 Adolph Echerle, Suttons Bay.
 Claus Van Glahn, Suttons Bay.
 L. E. Bahle, Suttons Bay.
 Fred Revolt, Suttons Bay.
 Con Lather, Suttons Bay.
 Geo. Steffens, Suttons Bay.
 Albert Hanson, Suttons Bay.
 Marcus Hoyt, Suttons Bay.
 Enor Christianson, Suttons Bay.
 J. J. Maakestad, Suttons Bay.
 John Smiseth, Suttons Bay.
 Philip J. Portner, Suttons Bay.
 Henry Kelsch, Suttons Bay.
 Frank Werler, Suttons Bay.
 William Reineke, Suttons Bay.
 Jacob Esch, Suttons Bay.

Prof. O. K. White, of Lansing, has been with us on three occasions, giving demonstrations on pruning and spraying, following in a short time with one on thinning. At our Agricultural Fair was held by him a demonstration on packing and grading of all fruits. All of which were highly appreciated and for which we extend to Prof. O. K. White and the State Association our hearty thanks.

W. M. PAYNE, M. D., Secretary.

KALAMAZOO COUNTY FRUIT GROWERS' SOCIETY.

(Auxiliary to State Society.)

OFFICERS.

President, E. V. Kendall,	-	-	-	-	-	-	-	Oshtemo.
Vice-President, Fred Meyers,	-	-	-	-	-	-	-	Alamo, Rural 13.
Secretary and Treasurer, H. L. Jacobson,	-	-	-	-	-	-	-	Kalamazoo, Rural 3.
Member of Executive Board, G. A. Cavanaugh,	-	-	-	-	-	-	-	Kalamazoo, Rural 10.
Member of Executive Board, J. R. Blake,	-	-	-	-	-	-	-	Galesburg

After the close of the past year, with much open weather and a large part of our crops in storage to dispose of we have not given the Society time or thought. We have only had three meetings but have arranged for several in the near future. This accounts for our small membership at present but I am sure we will have more in the near future. Members are as follows:

Harry Middleton, Kalamazoo, 204 N. Rose St.	E. R. Jackson, Plainwell.
E. F. Stoddard, Kalamazoo, R. 12.	G. A. Cavanaugh, Kalamazoo, R. 10.
H. L. Jacobson, Kalamazoo, R. 3.	Charles Scudder, Augusta.
E. V. Kendall, Oshtemo.	A. J. Shakesphere, Kalamazoo, R. 5.
Fred Meyers, Alamo, R. 13.	Miss E. C. Reynolds, 709 West Cedar St., Kalamazoo.
C. W. Thompson, 530 Wheaton Ave., Kalamazoo.	Wm. Healy, Bloomingdale.
Herman Wunderlin, 815 Stockbridge Ave., Kalamazoo.	W. H. Dennis, Kalamazoo, R. 5.
J. S. Oswald, Doster, Barry Co.	G. H. Seiler, Kalamazoo, R. 10.
	Geo. M. Chaenels, Alamo, R. 13.

Seventeen in all. I hope to have more in the near future. We are interested in the market conditions of our fruit, with strong talk of a cooperative system as outlined by our State Secretary, Mr. C. E. Bassett, who spoke to us on the first of March. We heartily agree with Mr. Bassett on the proposition. The consumer and producer must get in closer touch with each other. We also recommend honest measure with an honest pack label for advertisement and protection. We also recommend larger acreage, which will strengthen our organization and reduce the cost.

SOUTH HAVEN AND CASCO POMOLOGICAL SOCIETY.

(Organized 1871.)

OFFICERS FOR 1913.

[illegible]

MEMBERS.

C. E. Abell, Phoenix St., South Haven.
 R. H. Adkins, 627 Huron St., S. Haven.
 Alfing B. Alfing, S. Haven, R. 6.
 Robert Anderson, Covert.
 M. H. Bixby, 752 Wilson St., S. Haven.
 T. A. Bixby, R. 2.
 Ernest Burnham, Western Normal, Kalamazoo.
 Geo. E. Chatfield, S. Haven, R. 4.
 Leonard Chambers, S. Haven, R. 5.
 C. C. Chesebro, S. Haven, R. 3.
 A. B. Coit, 829 Phillips St., S. Haven.
 Henry Crabtree, 103 Main St., S. Haven.
 R. F. Dean, S. Haven, R. 3.
 Abel DeRocher, Berlamont.
 C. E. Fowler, R. 6.
 M. T. French, 320 Pearl St., S. Haven.
 H. P. Fullenwider, 853 Phoenix St., S. Haven.
 T. H. Frost, S. Haven.
 R. E. Gibson, Phoenix St., S. Haven.
 A. G. Goodridge, R. 2.
 W. F. Grady, S. Haven, R. 1.
 B. G. Green, S. Haven, R. 4.
 F. A. Gregory, S. Haven, R. 2.
 Geo. W. Griffin, S. Haven, R. 2.
 Willis Hallock, 205 Michigan Ave., S. Haven.
 E. A. Hartman, S. Haven.
 H. C. Heald, S. Haven, R. 3.
 Earl Hemenway, 203 Center St., S. Haven.
 A. R. Herriman, 200 Center St., S. Haven.
 S. F. Hill, 223 Huron St., S. Haven.
 D. E. Histed, S. Haven, R. 2.
 G. R. Hobbs, Bangor, R. 1.
 Jas. Hosking, Jr., S. Haven, R. 1.
 A. C. Hult, S. Haven, R. 2.
 J. C. Hunt, S. Haven, R. 1.
 J. C. Johnston, Kibbie, R. 2.
 John Jutkins, Grand Junction.
 E. L. Keasey, S. Haven, R. 1.

Martin C. Kehoe, S. Haven, R. 1.
 Jos. L. Kelley, R. 3.
 C. D. Leisnring, S. Haven, R. 3.
 Marshall Mackey, Phoenix St., S. Haven.
 H. E. Merritt, S. Haven, R. 2.
 C. S. Mills, S. Haven, R. 2.
 C. J. Moberg, S. Haven, R. 2.
 A. H. Monroe, Pearl St., S. Haven.
 C. J. Monroe, S. Haven.
 A. D. Moore, Phoenix St., S. Haven.
 John M. Mott, 405 Erie St., S. Haven.
 Geo. H. Myhan, 203 Dyckman Ave., S. Haven.
 A. F. Nagler, 351 Indiana Ave., S. Haven.
 John G. Nagler, S. Haven, R. 5.
 Jas. Nicol, S. Haven, R. 2.
 D. Ogden, S. Haven, R. 2.
 F. W. Osborn, S. Haven.
 Chas. Ott, S. Haven, R. 5.
 A. W. Overhiser, Kibbie, R. 2.
 F. J. Overton, Bangor, R. 1.
 J. Pedrick, S. Haven.
 Harry A. Randall, 199 Conger St., S. Haven.
 L. Schwaberow, S. Haven, R. 4.
 M. V. Selkirk, Phoenix St., S. Haven.
 E. E. Shaw, Grand Junction.
 H. L. Sherman, R. 6.
 Ralph P. Sherman, S. Haven, R. 6.
 Geo. R. Smith, S. Haven, R. 5.
 Wm. Smith, Phillips St., S. Haven.
 A. G. Spencer, Kibbie, R. 2.
 John Stout, R. 3.
 J. S. Templeton, 924 Postal Tel. Bldg., Chicago.
 Amos Tucker, Center St., S. Haven.
 F. E. Warner, S. Haven.
 Peter Watkins, S. Haven, R. 3.
 Robt. Watt, 832 Phillips St. S. Haven.
 Cecil Wilcox, S. Haven, R. 1.
 F. A. Wilken, 802 St. Joseph St., S. Haven.

LENAWEE COUNTY HORTICULTURAL SOCIETY.

Cicero S. Kendricks, Blissfield,	-	-	-	-	-	-	-	-	President.
N. D. Chew, Adrian,	-	-	-	-	-	-	-	-	Vice-President.
E. W. Allis, Adrian,	-	-	-	-	-	-	-	-	Secretary and Librarian.
H. C. Bradish, Adrian	-	-	-	-	-	-	-	-	Treasurer.
S. W. Bennett	}								
Adelbert Ward									
Dr. J. E. Westgate									
Helen Nickerson		-	-	-	-	-	-	-	Executive Committee.
Mrs. Carnahan									
Mrs. Kendrick									

Meetings held at Horticultural Hall, Court House, Second Wednesday of each month.

MEMBERS.

E. W. Allis, Adrian.	C. S. Kendrick, Blissfield.
S. W. Bennett, Adrian.	Mrs. C. S. Kendrick, Blissfield.
Mrs. S. W. Bennett, Adrian.	Mrs. Chas. Kimball.
H. C. Bradish, Adrian.	D. W. Love, Adrian.
Mrs. H. C. Bradish, Adrian.	Mrs. D. W. Love, Adrian.
Mrs. Frank Carnahan.	B. F. Mattern, Adrian.
N. D. Chew, Adrian.	Mrs. B. F. Mattern, Adrian.
Mrs. N. D. Chew, Adrian.	Mrs. Julia McFettridge, Adrian.
Hon. M. T. Cole, Adrian. (Died)	Miss Anna Meyer, Adrian.
H. L. Cole, Adrian.	Hon. W. H. Moore, Palmyra.
W. H. Cornelius, Adrian.	Mrs. W. H. Moore, Palmyra.
Mrs. Philomena Crane, Adrian.	Helen Nickerson, Adrian.
Mrs. Lucy Davis, Adrian.	Jeanette Nickerson, Adrian.
Alfred Edwards, Adrian.	Byron E. Niles, Blissfield.
Mrs. Alfred Edwards, Adrian.	W. G. Porter, Sand Creek.
Mrs. Harry Fee, Adrian.	Mrs. W. G. Porter, Sand Creek.
Mrs. Mary Gleason, Adrian.	Mrs. E. W. Reeder, Adrian.
Ben Gurin, Adrian.	Mrs. A. C. Taylor, Adrian.
Mrs. Wm. Gurin, Adrian.	Mrs. A. J. Walters, Adrian.
Rev. Samuel Heininger, Adrian.	Adelbert Ward, Adrian.
Mrs. S. Heininger, Adrian.	Dr. J. E. Westgate, Adrian.
Mrs. R. A. Hood, Adrian.	Mrs. Westgate, Adrian.
Mrs. Mary A. Howard, Adrian.	A. S. White, Adrian.
James H. Kelley, Adrian.	Mrs. Martha Willbee, Adrian.
Mrs. J. H. Kelley, Adrian. (Died)	Mrs. L. L. Wray, Adrian.

Hoping this may not be too late to be of service, I remain,

Very respectfully,
E. W. ALLIS, Secretary,
Adrian, Michigan.

JACKSON COUNTY FRUIT GROWERS' ASSOCIATION.

OFFICERS.

S. E. St. John,	-	-	-	-	-	-	-	-	-	-	President.
W. L. C. Reid,	-	-	-	-	-	-	-	-	-	-	Secretary.

MEMBERS.

L. H. Field, Jackson.	Burt C. Hicks, Jackson, R. 4.
W. B. Field, Jackson.	W. D. Soper, Jackson.
M. Gilbert, Jackson.	Clyde Kilpatrick, Jackson, R. 3.
Jos. Butler, Jackson, R. 5.	C. J. Reed, Spring Arbor.
John W. Boardman, Jackson.	Harr Bros., Jackson, R. 2.
W. L. C. Reid, Jackson.	R. A. Lee, Jackson, R. 6.
S. E. St. John, Jackson, R. 2.	W. E. Kennedy, Jackson.
M. L. Noon, Grass Lake, R. 3.	W. N. Curtis, Rives Jct., R. 1.
J. E. McQuillen, Jackson, R. 4.	Fred Graves, Rives, R. 1.
Roy Heath, Jackson, R. 4.	Geo. Stiles, Rives.
W. B. St. Johns, Jackson, R. 2.	H. F. Wing, Grass Lake.
Jay Laverty, Jackson, R. 5.	W. O. Maxson, Grass Lake.
Geo. Shuart, Jackson, R. 2.	B. R. Harrington, Munith.
Ned Beebe, Jackson, R. 9.	Ray Borner, Albion.
C. A. Bullard & Son, Jackson.	L. B. Benton, Napoleon.
M. L. Abby, Jackson, R. 4.	Wm. N. Ottney, Jackson, R. 4.
B. A. Simonds, Jackson, R. 5.	R. D. Simmons, Jackson, R. 2.
I. A. Thayer, Jackson.	Milton French, Jackson, R. 3.
Vern Snyder, Jackson, R. 8.	John G. Noon, Grass Lake, R. 3.
S. B. Davis, Jackson.	J. Geo. Friedrichs Brooklyn, R. 3.
Frank Thompson, Jackson.	Enoch Bancker, Jackson.
H. G. Bailey, Jackson, R. 5.	C. F. Hutchins, care M. C. R. R., Homer.
H. W. Maguire, Mason.	Wm. Newman, Jackson.
C. E. Shotwell, Jackson.	Floyd C. Palmer, Jackson, R. 3.
B. C. Cole, Jackson, R. 9.	L. L. Wheeler, Parma.
Norton Bros., 326 Losey St., Jackson.	A. E. Ellisthorpe, Jackson, R. 7.
S. Schemahorn, Jackson, R. 7.	Dr. C. G. Parnell, Jackson.
E. L. Farrand, Jackson.	Mrs. L. A. Cooley, Jackson, R. 7.
J. E. Blake, Jackson, R. 2.	Wm. S. Cobb, Jackson.
C. W. Krooze, Jackson.	Willard C. Weeks, Napoleon.
J. E. Boey, Jackson, R. 5.	B. F. Lair, Jackson, R. 5.
H. J. Wilbur, Springport.	C. A. Barnes, Jackson.
E. T. Webb, Jackson.	Chas. H. Allen, Jackson.
H. B. Snow, Parma, R. 1.	W. J. O'Dwyer, Jackson.
Roy Brown, Jackson, R. 5.	O. S. Ludlow, Parma.
J. and C. Waltz, Jackson, R. 3.	C. W. Flansburg & Son, Jackson, R. 7.
Henry England, Jackson, R. 9.	Allen Bros., Jackson, R. 3.
H. C. Wollfle & Co., Spring Arbor.	L. E. Landon, Springport.
B. J. Nichols, 207 Merriman St., Jackson.	L. Whitney Watkins, Manchester.
John B. Ford, Jackson, R. 7.	J. W. Dart, Spring Arbor.
Glasgow Bros., Jackson.	E. C. Baker & Son, Jackson, R. 2.
Jos. Johnson, Jackson, R. 5.	J. P. Townsend, 811 Wildwood Ave., Jackson.
Carl Johnson, Jackson, R. 6.	F. C. Burdick, Rives Jct., R. 3.
C. W. Bond, Jackson, R. 4.	C. E. Strong, Somerset Center.
D. B. Hatton, Rives Jct., R.	Walter L. Ford, Brooklyn.
Hadley Bros., Parma.	David Walker, Brooklyn.
H. G. Marvin, Jackson.	Jos. North, Brooklyn.
Chas. Huntoon, Jackson, R. 5.	W. E. Eckerson, Rives Jct., R. 3.
James Davey, Jackson.	J. H. Gaunt, Jackson.
E. Bromley, Onondaga, R. 2.	H. C. Richardson, Jackson, R. 1.
E. B. Davidson, Cement City.	Dr. W. W. Lathrop, Jackson.
Chris Siegrist, Rives Jct., R. 3.	A. N. Sova, Jackson, R. 9.
Jacob Cooley, Jackson, R. 7.	P. Fisher, Rives Jct., R. 2.
Amos Rhoades, Jackson, R. 1.	

W. Abby, Rives Jct., R. 2.
 C. W. McCoy, 296 Wildwood Ave., Jackson.
 D. E. Turner & Son, Mosherville.
 W. H. Cordon, Jackson.
 Jos. Lutz, Grass Lake, R. 2.
 C. J. Hankerd, Munith, R. 1.
 G. Ray Reed, Clark's Lake, R. 2.
 Dr. W. E. Spicer, Jackson.
 D. S. Fleming, Jackson.

W. W. Fisk, Jackson.
 Walter E. Sharp, Onondaga, R. 2.
 Albert J. Walker, Brooklyn.
 J. C. Bean, Jackson, R. 5.
 H. B. Kane, Jackson, R. 4.
 Leo Woodin, Hanover.
 Ivester Young, Jackson, R. 2.
 Vill Updyke, Jackson, R. 2.
 Jas. W. Dey, Springport.

BENZIE COUNTY HORTICULTURAL SOCIETY.

(Auxiliary to State Society.)

OFFICERS.

G. L. Dressel,	-	-	-	-	-	-	-	-	-	-	President.
Joseph Smeltzer,	-	-	-	-	-	-	-	-	-	-	1st Vice-President.
W. J. Pettitt,	-	-	-	-	-	-	-	-	-	-	2nd Vice-President.
E. J. Parker,	-	-	-	-	-	-	-	-	-	-	Secretary.
Allen Case,	-	-	-	-	-	-	-	-	-	-	Treasurer.

MEMBERS.

George Allen, Frankfort.
 Victor Allsberg, Elberta.
 Roscoe Burtker, Elberta.
 Allen Case, Frankfort.
 C. H. Chapman, Frankfort.
 N. J. Crawford, Elberta.
 George Cornell, Elberta.
 Ed. Crawford, Arcadia.
 John W. Cruse, Honor.
 C. F. Collier, Frankfort.
 E. Curtis, Frankfort.
 J. L. Chandler, Elberta.
 J. F. Conboy, Elberta.
 W. L. Davis, Frankfort.
 E. Dragoo, Elberta.
 G. L. Dressel, Frankfort.
 John Ehman, Elberta.
 A. Fairchild, Frankfort.
 Francis Forrester, Elberta.
 M. E. Gavigan, Arcadia.
 S. C. Glarum, Elberta.
 Carl P. Gregerson, Frankfort.
 John Howard, Arcadia.
 C. Jacobson, Frankfort.
 Mrs. E. L. Johnson, Frankfort.
 C. J. Kinney, Frankfort.
 C. C. Keillor, Arcadia.
 Mrs. M. A. Knapp, Frankfort.
 H. A. Lewis, Frankfort.
 Wm. Little, Elberta.
 E. G. Lord, Arcadia.

Cris. Mathieson, Frankfort.
 Peter Mathison, Elberta.
 George M. Moore, Frankfort.
 George Morency, Frankfort.
 R. Mortensen, Arcadia.
 J. E. Nelson, Frankfort.
 E. M. O'Blenis, Thompsonville.
 F. W. Palmer, Frankfort.
 Byron Parker, Frankfort.
 E. J. Parker, Frankfort.
 M. D. Persing, Frankfort.
 W. J. Pettit, Benzonia.
 V. L. Putney, Arcadia.
 Wallace, Putney, Arcadia.
 R. B. Reynolds, Bendon.
 Miss C. H. Rogers, Thompsonville.
 Paul Rose, Elberta.
 Joseph Smeltzer, Elberta.
 Wesley Smeltzer, Elberta.
 L. D. Spafford, Lake Ann.
 H. A. Sperry, Frankfort.
 Haven Talbert, Frankfort.
 W. R. Thomas, Frankfort.
 Loyd Valleau, Lake Ann.
 J. W. Van Deman, Benzonia.
 Wm. G. Voorheis, Elberta.
 Sam. Willis, Thompsonville.
 Byron Wolcott, Elberta.
 Seymour Wright, Elberta.
 U. S. Young, Frankfort.

MASON COUNTY HORTICULTURAL SOCIETY.

(Auxiliary to State Society.)

OFFICERS.

Smith Hawley,	-	-	-	-	-	-	-	-	-	-	-	President.
R. J. Fitch,	-	-	-	-	-	-	-	-	-	-	-	Vice-President.
R. C. Sabin,	-	-	-	-	-	-	-	-	-	-	-	Secretary-Treasurer.

MEMBERS FOR 1912.

O. E. Hawley, Ludington, R. 3.	Andrew Thompson, Ludington, R. 3.
Wm. Fitch, Ludington, R. 3.	Jerome Harmon, Ludington, R. 1.
C. W. Fitch, Ludington, R. 1.	H. D. Stowell, Ludington, R. 1.
R. C. Sabin, Ludington, R. 3.	J. H. Gamertsfelder & Son, Ludington, R. 1.
C. G. Wing, City.	Wm. Wadel, Ludington, R. 1.
Geo. Cribbs, Ludington, R. 3.	R. J. Fitch, Ludington, R. 3.
A. J. Houk, Ludington, R. 1.	John Rinebolt, Ludington, R. 1.
J. H. Withey, Ludington, R. 1.	Fred Peterson, Ludington, R. 3.
Martin Lund, Ludington, R. 3.	Michael Fitch, Ludington, R. 3.
Wm. Metzler, Ludington, R. 3.	Frank Kibbey, Ludington, R. 3.
J. H. Burns, Ludington, R. 1.	Arthur Morton, Ludington, R. 1.
J. H. Fitch, Ludington, R. 1.	Donald Jameson, Ludington, R. 3.
Wm. Kennedy, Ludington, R. 1.	Gilbert Broder, Ludington, R. 3.
Joseph Sellner, Ludington, R. 1.	Fred Beebe, Ludington, R. 1.
W. F. Curratt, Ludington, R. 3.	Henry Meisenheimer, Ludington, R. 3.
J. A. Gamertsfelder, Ludington, R. 1.	Joe. Pallasch, Ludington, R. 1.
Albert Kinney, Ludington, R. 1.	D. H. Morton, Pentwater, P. O., R. 1.
L. L. McClatchie, Ludington, R. 3.	Jas. McDonald, (no paper).
Louis Hawley, Ludington, R. 3.	C. L. Houk, Ludington, R. 3.
D. H. Grout, Ludington, R. 3.	Jesse Houk, Ludington, R. 3.
Smith Hawley, Ludington, R. 3.	A. R. Benjamin, Ludington, R. 3.
L. B. Lyon, Ludington, R. 3.	Joe. Prevost, Ludington, R. 3.
Theo. Ervin, Ludington, R. 3.	V. L. Olmstead, Ludington, R. 3.

IONIA COUNTY HORTICULTURAL SOCIETY.

(Auxiliary to State Society.)

OFFICERS FOR 1912.

President, Claude Dickerson,	-	-	-	-	-	-	-	-	-	-	-	Ionias.
Vice-President, Henry L. Nielson,	-	-	-	-	-	-	-	-	-	-	-	Ionias.
Secretary, Frank E. Hall,	-	-	-	-	-	-	-	-	-	-	-	Ionias.
Treasurer, Herbert F. Kellogg,	-	-	-	-	-	-	-	-	-	-	-	Ionias.

MEMBERS.

Herbert F. Kellogg, Ionia.	F. P. Trowbridge, Ionia.
Claude C. Dickerson, Ionia.	Herbert L. Smith, Shiloh.
Geo. E. Dickerson, Ionia.	Jens Jensen, Orleans.
Perry H. Stebbins, Saranac.	H. L. Nielsen, Ionia.
Chas. C. Luce, Ionia.	John Flater, Ionia.
Ray Normington, Ionia.	C. I. Goodwin, Ionia.
Thos. F. Martin, Ionia.	Frank E. Hall, Ionia.
Luther E. Hall, Ionia.	Geo. Gott, Ionia.
Lee P. Spalding, Ionia.	Maurice Yeomans, Ionia.
E. E. Branch, Ionia.	Ivan J. Brooks, Ionia.
H. D. Waldron, Ionia.	Geo. Hulleberger, Saranac.



O. K. White, Field Agent in Horticulture, M. A. C., conducting a demonstration in thinning.

F. T. Flanagan, Orleans.
 Geo. E. Green, Ionia.
 Chas. Mattison, Ionia.
 James Little, Shiloh.
 J. B. Welch, Ionia.
 E. D. Weaver, Ionia.
 W. W. Bemis, Ionia.
 B. E. Goodwin, Ionia.
 H. B. Webber, Ionia.
 Chas. Stoddard, Ionia.
 J. R. Densmore, Ionia.
 Wm. Robertson, Ionia.
 Chas. North, Fenwick.
 Arthur Wilson, Ionia.
 James A. McCarty, Ionia.
 Harry S. Knapp, Muir.
 J. J. Eaves, Ionia.
 Samuel Eavey, Ionia.

H. R. Bluemley, Butternut.
 Fred Vanderheyden, Ionia.
 Clyde Sigourney, Ionia.
 Fred Glostrick, Ionia.
 D. A. McQuaid, Ionia.
 M. J. Allen, Ionia.
 A. G. Smith, Ionia.
 Elmer Peabody, Shiloh.
 Chas. Begerow, Lake Odessa.
 James Dildine, Ionia.
 P. C. Freeman, Lowell.
 E. H. Hunt, Saranac.
 Fred Kendall, Ionia.
 P. M. Slaybaugh, Orleans.
 B. A. Yeomans, Ionia, R. 4.
 George Sage, Ionia.
 Daniel Slowinski, Lake Odessa, R. 39.

NORTHPORT FRUIT GROWERS' ASSOCIATION.

(Auxiliary to State Society.)

OFFICERS.

R. E. Flood,	-	-	-	-	-	-	-	-	-	-	-	President.
Antoine Bartlett,	-	-	-	-	-	-	-	-	-	-	-	Vice-President.
A. Bentall,	-	-	-	-	-	-	-	-	-	-	-	Secretary-Treasurer.

MEMBERS.

A. F. Anderson, Omena.
 Bordeaux, Allan, Northport.
 Bordeaux, J. A., Northport.
 Barnes, L. A., Northport.
 Barth, Otto J., Northport, R.
 Barth, Otto G., Northport, R.
 Brown, A., Omena, R.
 Braman & Son, Northport.
 Bartlett, Antoine, Omena, R.
 Baumberger, C. A., Northport.
 Barnes, Dell, Northport, R.
 Brown, J. D., Northport, R.
 Bentall, A., Northport.
 Barth, Walter, Northport, R.
 Bartlett, Wm., Northport, R.
 Bartlett, Oscar, Northport, R.
 Birnbaum, J. W., 11205 Superior Ave.,
 Cleveland, Ohio.
 Bowles, J. H., Northport.
 Brown, W. R., 145 Lake Ave., Grand
 Rapids, Mich.
 Bartlett, Amos, Northport.
 Brace, Julius, Northport.
 Baumberger, Fred, Northport, R.
 Budd, Robert, Northport.
 Chlausen, P., Northport.
 Curran, J. M., 19 S. LaSalle St., Chicago,
 Ill.
 Cutcheon, J. M., Winston, Salem, S. C.
 Dame, G. M., Lansing, Mich.
 Dame, Isa, Northport.
 Dinsmore, E. J., Northport, R.

Egeler, Ph., Northport.
 Foltz, W. N., Omena.
 Flood, D. R. E., Northport.
 Fonda, W. E., 11203 Superior Ave.,
 Cleveland, Ohio.
 Frederickson, Nels, Northport, R.
 Garthe, Isaac, Northport, R.
 Garthe, Esten, Northport, R.
 Garthe, S. C., Northport.
 Garthe, Seth, Northport.
 Gustaff, O. C., Northport.
 Gill, Wm., Northport, R.
 Gorman, W. P., Omena.
 Griffis, R. E., Omena, R.
 Hills, R. E., Delaware, Ohio.
 Holton, J. N., Northport, R.
 Johnson, Alfred, Northport, R.
 Johnson, Adalph, Northport, R.
 Johnson, Fred, Northport, R.
 Joint, C. L., Omena, R.
 Krebs, G. J., Omena, R.
 Kehl, Jas., Northport.
 Kehl, Ed., Northport.
 Kehl, C. B., Northport.
 Kilcherman, E., Northport, R.
 Keyes, S. Omena.
 Leslie, A. M., 201 Main St., Evanston, Ill.
 Lackie, W., Omena, R.
 Maule, Mrs. Anna, Omena, R.
 Middleton, Al., Northport, R.
 Matthews, J. F., Northport.
 Milliken, A. H., Northport.

- | | |
|---|--|
| Maresh, Antoine, Northport, R. | Sanders, D. L., Grand Rapids, Mich. |
| Massa, J. A., Northport. | Sutherland, Rev. J. W., Lansing, Mich. |
| McMachen, A., Omena, R. | Steele, W. F., Northport. |
| Morgan, N. J., Omena, R. | Steele, W. H., Northport. |
| Middleton, Elmer, Northport. | Steele, Geo., Omena, R. |
| Middleton, Frank, Northport, R. | Smith, R. P., Omena, R. |
| Nelson, C. A., Northport, R. | Scott, J. E., Omena, R. |
| Nelson, W. P., Northport, R. | Scott, Hugh, Northport, R. |
| Nelson, Andrew G., Northport, R. | Scott, D. H., Northport. |
| Peck, L. R., Northport. | Scott, Henry, Northport, R. |
| Porter, S. W., Northport. | Scott, Birney, Northport. |
| Putnam, B. J., Northport, R. | Schroeder, M., Northport. |
| Probst, R., Northport, R. | Swanson, Ed., Schomberg, Mich. |
| Purkiss, Thos., Northport, R. | Thomas, Robt., Northport, R. |
| Putnam, J. D., Omena, R. | Thomas, J. J., Northport, R. |
| Peterson, Oscar, Northport, R. | Thomas, W. J., Northport, R. |
| Richner, C. A., Omena, R. | Van Holt, J., Omena, R. |
| Ranger, Irving, Northport, R. | Voice, Walter, Northport. |
| Rogers, L., Northport, R. | Wurzburg, P., Northport. |
| Sargent, Rev. C. S., 2117 Talbott Ave.,
Indianapolis, Indiana. | Warnquist, A., Northport, R. |
| Smith, L. C., Northport, R. | Wiley, Robt., Omena. |
| | Wheeler, L. H., Omena. |

LIFE MEMBERS OF THE STATE HORTICULTURAL SOCIETY.*

* NOTE.—A Life membership which was formerly \$10 is now \$5. The fund thus gathered is invested in good securities and only the interest employed for *general* purposes. The Secretary desires information as to the death or change of address of any life member. Notice of the death of a member should be accompanied by a sketch of the life of the deceased one, to be entered in the records of the State Society.

Name.	P. O. Address.	County.
Adams, H. Dale	Galesburg	Kalamazoo.
Allis, E. W.	Adrian	Lenawee.
Allis, Miss Mary C. (Mrs. Beal)	Adrian	Lenawee.
Ansley, C. F.	Iowa City	Iowa.
Armitage, James	Monroe	Monroe.
Aveline, J. B., Rural 5	Montague	Muskegon.
Bailey, L. H., Jr.	Ithaca	New York.
Baker, Klaus, Rural 11, Box 97	Holland	Ottawa.
Baldwin, O. A. D.	Bridgman	Berrien.
Ballard, Ralph, Rural 4	Niles	Berrien.
Barden, F. M., Rural 6	South Haven	Van Buren.
Barnhart, Herbert, Rural 1	Fremont	Newaygo.
Bartram, Burr, Rural 4	Benton Harbor	Berrien.
Bassett, Chas. E.	Fennville	Allegan.
Baumann, Archie J.	New Richmond	Allegan.
Beal, J. L.	Addison	Lenawee.
Beatty, F. E.	Three Rivers	
Becker, D. N., Star Route	Hesperia	Oceana.
Beckman, Geo. H., Rural 3	Ludington	Mason.
Bennett, S. Oscar	Holland	Ottawa.
Bishop, Dr. H. A.	Millington	Tuscola.
Blain, A. W., Supt. Elmwood Cemetery	Detroit	Wayne.
Blue, George	Traverse City	Grand Traverse.
Bowker Insecticide Co., 43 Chatham St.	Boston	Massachusetts.
Bowles, J. H.	Northport	Leelanau.
Brackett, G. B.	Washington	D. C.
Brassert, Walter O., Rural 1	Paw Paw	Van Buren.
Bristol, W. H.	Almont	Lapeer.
Brown, F. E.	Traverse City	Grand Traverse.
Brown, G. L. A.	Decatur	Van Buren.
Brubaker, C. S.	Hartford	Van Buren.
Brunson, Dr. E. E.	Ganges	Allegan.
Bryant, C. T.	South Haven	Van Buren.
Buckman, R. M.	Sodus	Berrien.
Bullock, A. M.	Lapeer	Lapeer.
Burham, W. P.	Ionia	Ionia.
Burton, Turley J.	Mitchell	Indiana.
Burrows, Geo. L., Jr.	Saginaw City	Saginaw.
Buskirk, M. D.	Paw Paw	Van Buren.
Caie, Robt.	Yarmouth	Nova Scotia.
Chamberlain, Glenn R., Gas Co.	Grand Rapids	Kent.
Chapman, Austin B.	South Rockwood	Monroe.

Name.	P. O. Address.	County.
Chatfield, Geo. E.	South Haven.	Van Buren.
Cheney, Calvin A.	Maple City.	Leelanau.
Church, Wm. E., Title & Trust Bldg.	Chicago.	<i>Illinois.</i>
Coith, Alwin.	South Haven.	Van Buren.
Collins, G. H.	Hartford.	Van Buren.
Cook, A. J.	Claremont.	<i>California.</i>
Cook, C. B.	Owosso.	Shiawassee.
Cook, W. N.	Grand Rapids.	Kent.
Cooper, Madison.	Calcium.	<i>New York.</i>
Countryman, E. J., 111 Galena Ave.	Dixon.	<i>Illinois.</i>
Crane, John H., R. F. D. 1.	Fennville.	Allegan.
Crawford, Robt. J.	Armada.	Macomb.
Cribbs, W. C.	Watervliet.	Berrien.
Curtice, J. E.	Coleman.	Midland.
Darlington, Frank, Rural 4.	Hesperia.	Oceana.
Davidson, C. M. & Co.	Rockwood.	<i>Ohio.</i>
Davis, Horace W.	Lapeer.	Lapeer.
Davis, W. H.	Perrinton.	Gratiot.
Day, D. H.	Glen Haven.	Leelanau.
Dayton, J. H.	Painesville.	<i>Ohio.</i>
Deamud, J. B., 51 Wabash Ave.	Chicago.	<i>Illinois.</i>
Decker, Walter E., Rural 20.	Orleans.	Ionia.
Dickerson, Claude C., Route 1.	Ionia.	Ionia.
Dickerson, F. B.	Detroit.	Wayne.
Dickerson, Geo. E., Stage Route.	Ionia.	Ionia.
Dieckman, Mrs. Josephine M.	East Saginaw.	Saginaw.
Dietrich, M. J.	Arcadia.	Benzie.
DuMez, John.	Holland.	Ottawa.
Dutton, Chas. S.	Holland.	Ottawa.
Dykman, J.	East Saginaw.	Saginaw.
Eckard, W. C.	Eaton Rapids.	Eaton.
Edwards, O. C. (sanitarium).	Battle Creek.	Calhoun.
Elsworth, R. H.	Traverse City.	Grand Traverse.
Ernsberger, R. J.	Watervliet.	Berrien.
Farley, Fred.	Almont.	Lapeer.
Farrand, T. A.	Eaton Rapids.	Eaton.
Field, Wm. A.	South Chicago.	<i>Illinois.</i>
Fraleigh, J. O.	Casnovia.	Muskegon.
France, J. G.	Marshall.	Calhoun.
Freeman, Mrs. Agnes, 325 E. Jefferson.	Ann Arbor.	Washtenaw.
Freund, Chas.	St. Joseph.	Berrien.
Friday, George.	Coloma.	Berrien.
Friday, Jacob.	Coloma.	Berrien.
Frost, Frank H., Rural 6.	South Haven.	Van Buren.
Garfield, Chas. W.	Grand Rapids.	Kent.
Gathman, Mrs. Augusta, 1103 Grace St.	Chicago.	<i>Illinois.</i>
Gebhardt, Benton.	Hart.	Oceana.
Geddes, David.	Saginaw.	Saginaw.
Geisler, Wm., Rural 2, box 92.	St. Joseph.	Berrien.
Getz, Geo. F., Lakewood Farm.	Holland.	Ottawa.
Gephart, H. W.	Hart.	Oceana.
Graham, Elwood.	Grand Rapids.	Kent.
Grand Traverse Fruit Co., 1008 Ford Bldg.	Detroit.	Wayne.
Grant, John F., 2710 Indiana Ave.	Chicago.	<i>Illinois.</i>
Gray, W. B.	Traverse City.	Grand Traverse.
Green, S. A.	Hillsdale.	Hillsdale.
Greening, Charles E.	Monroe.	Monroe.
Hale, Charles F., Rural 49.	Lowell.	Kent.
Hall, Alfred R., R. F. D 4.	Buchanan.	Berrien.

Name.	P. O. Address.	County.
Hall, Louis A., Rural 1.....	Berlin.....	Kent.
Hall, Luther E.....	Ionia.....	Ionia.
Halstead, J. B.....	Farmington.....	Oakland.
Habegger, Louis.....	Woodburn.....	Indiana.
Hamilton, Frank C.....	Northville.....	Wayne.
Hamlin, J. H., Rural 1.....	Bravo.....	Allegan.
Handy, Fred R.....	Sodus.....	Berrien.
Hawley, George A.....	Hart.....	Oceana.
Hawxhurst, W. F.....	Saline.....	Washtenaw.
Hayes, N. B.....	Muir.....	Ionia.
Hayden, Mrs. H. A.....	Jackson.....	Jackson.
Heinze, Edward F., R. F. D. 2.....	St. Joseph.....	Berrien.
Hemstreet, F. H.....	Bellaire.....	Antrim.
Heuser, J. H., 1262 Monadnock Bldg.....	Chicago.....	Illinois.
Hill, R. Carroll.....	Ann Arbor.....	Washtenaw.
Hinebaugh, Wm. H.....	Ottawa.....	Illinois.
Hinkins, W. A., R. 4.....	Benton Harbor.....	Berrien.
Hoffman, M., Rural 2.....	St. Joseph.....	Berrien.
Hogue, H. H., Rural 1.....	Sodus.....	Berrien.
Holloway, Geo. F.....	Sawyer.....	Berrien.
Hoopes, Abner.....	West Chester.....	Pennsylvania.
Hopkins, A. L.....	Bear Lake.....	Manistee.
Hosner, O. G., Rural 1.....	Oxford.....	Oakland.
Howard, J. H.....	Arcadia.....	Manistee.
Howe, J. C.....	Old Mission.....	Grand Traverse.
Hubbard, Geo. M., Rural 1.....	Jenison.....	Ottawa.
Huey, Harold E., Rural 2.....	Shelby.....	Oceana.
Hughston, J. A., Lock Box 16.....	Grand Rapids.....	Kent.
Hunt, L. C.....	Eaton Rapids.....	Eaton.
Husted, Noah P.....	Lowell.....	Kent.
Hutchins, Edward, R. F. D. 1.....	Fennville.....	Allegan.
Ilgenfritz, C. A.....	Monroe.....	Monroe.
Jenks, S. G., Rural 3.....	Shelby.....	Oceana.
Johnson, R. L.....	Lawrence.....	Van Buren.
Johnson, William.....	Vassar.....	Tuscola.
Kales, Dr. John D., Savings Bank Bldg.....	Chicago.....	Illinois.
Keasey, E. L.....	South Haven.....	Van Buren.
Keith, B. H.....	Sawyer.....	Berrien.
Keith, Bert W.....	Winona Lake.....	Indiana.
Kellogg, Herbert.....	Ionia.....	Ionia.
Kelly Bros.....	Dansville.....	New York.
Kempf, Geo. J.....	Tecumseh.....	Lenawee.
Kennedy, Thos., Rural 3.....	Hesperia.....	Oceana.
Kennedy, Wm., Rural 3.....	Hesperia.....	Oceana.
Keppel, Thos.....	Zeeland.....	Ottawa.
Kettle, Burt.....	Coopersville.....	Ottawa.
Kidd, J. H.....	Ionia.....	Ionia.
Kingsley, H. J.....	Fennville.....	Allegan.
Klien, F. J., Rural 1.....	Farmington.....	Wayne.
Kniebes, C. C.....	Watervliet.....	Berrien.
Knight, David & Son.....	Sawyer.....	Berrien.
Krebs, Geo. J.....	Northport.....	Wayne.
Ladd, E. O.....	Old Mission.....	Grand Traverse.
LaDuke, L. B.....	Lawrence.....	Van Buren.
Lasch, A. A., Rural 2.....	Suttons Bay.....	Leelanau.
Lass, Peter H., Rural 1.....	Bear Lake.....	Manistee.
Lawrence, F. E.....	Cressey.....	Barry.

Name.	P. O. Address.	County.
Lawrence, L. L.	Decatur	Van Buren.
Leggett, E. E.	Fennville	Allegan.
Lindsley, Geo. W.	Harbor Springs	Emmet.
Lincoln, L. C.	Greenville	Montcalm.
Loomis, P. B.	Jackson	Jackson.
Lord, E. G., Box 56 Rural	Arcadia	Manistee.
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Mead, A. F., Rural 11	Battle Creek	Calhoun.
Merritt, H. E., Rural 2	South Haven	Van Buren.
Merritt, J. E.	Manistee	Manistee.
Messer, G. W.	Almont	Lapeer.
Methven, C. S.	Holland	Ottawa.
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Miller, Frank A.	Northville	Wayne.
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Monroe, Mrs. Clara O.	South Haven	Van Buren.
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Overton, Miller	Bangor	Van Buren.
Palmer, W. S.	Kalkaska	Kalkaska.
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Petersen, Oscar H.	Northport.	Leelanau.
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Preston, Wm. F.	Fremont.	Newaygo.
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Scott, E. H.	Ann Arbor.	Washtenaw.
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Stearns, W. E.	Chicago	Illinois.
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Steere, B. W.	Carthage	Indiana.
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Stroven, Harry	Fremont	Newaygo.
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A. A. Lasch in his four-year-old cherry orchard near Suttons Bay. Mr. Lasch has 35,000 trees in his several orchards in Leelanau county.

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Witmer, John.....	Brown City.....	Sanilac.
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Woodward, David.....	Clinton.....	Lenawee.
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Hamilton, W. L.	Bangor.....	
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